Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

more personal aspects particularly is frowned upon by elders in open but tacitly approved in fact. In contact with white people the Pukapukans always speak and act as if they heartily believed and followed the missionary code. It took us many months to persuade them that we did not care to pass judgment upon what they thought and did but that what really interested us was to find out what these acts and thoughts were. As informants gained confidence in us, they dropped their usual attitude of "being on their best behavior" when we were present and were much more natural and free. This attitude of confidence was sufficient for us to gain insight into some of the more implicit phases of Pukapukan life, but even at the end of our stay we were baffled in our attempts to penetrate far below the surface. The cultural veneer of mid-Victorian morality is sufficiently deep to withstand any penetration save that based on long years of patient probing.

White contact has affected least of all the economic life and the manufacture of native articles. Though many Pukapukans today live in coral lime houses in the permanent villages, native houses still predominate, especially in the copra-making villages. The people wear European clothes; the women wear dresses, the men trousers and, when not working, shirts as well. The use of native clothing had almost disappeared by 1934. Because there has been little money available to buy fresh clothes some women now eke out the life of old rags by wearing coconut-leaf kilts over these during working hours. Boys under 12 or 13 years of age go naked for the most part, reserving pants and shirts for school and church wear. Girls wear dresses from the tenderest age onward. Presumably this tendency would be reversed if the first missionaries had been women.

Every household is supplied with knives, usually a cooking pot, tins as drinking utensils, and mosquito nets. Fishermen commonly use iron fishhooks but they still largely retain the use of native fishlines. Native plank canoes, lashed with sennit, are in common use, the several flat-bottomed European boats being used only for transport of copra and cargo over the reef. Beyond these obvious changes, economic life functions today largely according to old patterns. The few items that could not be made for the Bishop Museum collection consisted mainly of plaited garments apparently infrequently worn in the old days.

LIMITATIONS OF MATERIAL

Data on the more personal and implicit aspects of the culture were obtained from special informants with whom we had built up a confidential friendship, usually without the medium of an interpreter. The material on formal social life, save where it relates to the old-time governing authorities, to the powers of the chiefs and elders, or to the general tapus surrounding the chiefs, is reasonably reliable. Questioning of informants has been sup-

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

of the lagoon or on sandy bottoms close to the beach. The following fish are commonly speared: *pula, ali, patelatele, uhua* (a deep-water fish speared outside the lagoon), *tupoupou, toetoeoma;* the eels; the trigger family, deep-sea members of which are sometimes found inside the lagoon; *uriuriki, yoyalo, pulu uli, piopio, matuele, lali,* and *fapa.* The various rays are speared with a *tao,* to the base of which a sennit cord is tied so that the spear will not be lost.

3. Torch fishing. Torches (*lama*) are made late in the afternoon preceding the fishing. Two dry coconut midribs are used for the reef fishing torch (*lamalama akau*), three midribs for the *malau* fishing torch (*lama malau*). To make the reef fishing torch the broad butt is cut from each midrib. The first midrib is laid on the ground, dull side (*tua,* back) down, the smooth side (*mulivakevake*) facing upward. The second midrib is placed on top of the first, the dull side of the second leaf next to the smooth side of the first. Starting from the butt end, the worker gathers together with both hands the leaflets for a length of about 18 inches. Holding these with the left hand, he takes with the right hand two leaflets from the underneath leaf and twists these several times around the gathered leaflets of both leaves. Then he picks up with the left hand two leaflets from the top leaf and twists the first two leaflets three or four times around the second two leaflets and buries the twisted leaflets under the general gathering of leaflets. He gathers up all the leaflets for a second fastening about 18 inches from the first, and proceeds thus until he has made a compact bundle. When fired, the torch burns down to the fastening and then smoulders. The buried leaflets are then loosened by a shake or by a flick of the hand and flame up again. To dim a torch by lowering the head and then make it flame again by raising the head is termed *uukapulepule.*

Of the two fishers, the assistant holds the torch and carries the spare ones so that the fisherman is free to catch the fish. The light of the torch shows the sleeping fish or attracts them to the surface, where they are speared or clubbed to death. The partners progress along the reef shelf, probing with the torch on the inside of the reef. The fish caught are strung together on a cocoaut fiber or placed in a basket. Fish caught by reef torch fishing are: *haloma, ie, maono, unaliki, mayi, kanae, uloulo, kotimu,* parrot fishes, and all the reef fish caught by reef groping.

Torching is also used in catching flying fish and *malau* (p. 58) and for canoe fishing outside the reef (*yi uukapulepule*). The canoe is either stationary or allowed to drift slowly down the reef. A torch is held by one member of the canoe crew to attract to the canoe such fish as night-feeding cangaroids, barracuda, dog fish, and tuna. The bait and hook used depend on the type of fish to be caught.

WEIRS AND SWEEPS

The walled stone fishweir (p. 159), used for catching reef fish in the shallow waters of the lagoon, is called *pa wutu iku* or *tawenga*; the method of using it, *tali tawenga*:

The weirs are placed in the reef shallows at places where the water at ebb tide is not more than 1 foot deep. The fish come inshore from the reef at high tide. At the ebbing of the tide, when they are carried out again, the exit of the weir is blocked with a scoop net (*tae yaeke*) or with a cone-shaped fishing basket (*ola wuli au*) weighted down with a stone. The fisherman watches the course of the weir and has his net or basket ready when the fish enter. His partner beats the water behind the fish and drives them to the exit. The mouth of the basket is closed as soon as the fish enter and then the basket is raised from the water. The fish are lifted out, transferred to another fishing basket, and the basket reset for more fish.

Stone weirs are the property of the village on whose stretch of lagoon shallows they are built. All men of the owning village use the weirs freely at any time. Fish

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

226 caught with the stone weir are: *unaliki, taloo, lupo, pakeru, lalawutu, lai, ume, palangi, malevu, hayaye, ma, maito, ava, hiokiotai, atule, 'poyala, palu uli, piopio, matacle, lali,* and *papa.*

227 Coconut-leaf weirs (*pa lama launiu*), less permanent than stone weirs, may be easily moved about the lagoon shallows according to the running of the fish:

To make a weir, dried coconut midribs are split longitudinally. Three or more half-leaves are placed on top of each other, and the leaflets gathered together and tied with *halava* coconut fibers. An appropriate section of lagoon or fish pond is chosen and stakes are driven into the bottom in pairs. The space between the two stakes of each pair is about 18 inches, and the series of pairs are about 6 feet apart. A sufficient number of pairs is set up to give the required length to the wings of the weir, the base toward the beach and the exit toward the reef. The bundles of coconut midribs are laid between the pairs of stakes to make the walls about 18 inches high. Some weirs (*matau*) have a permanent stone mouth to which the leaf-walls are linked.

226 The mouth of the simple leaf weir or of the composite stone-and-leaf weir is blocked with a scoop net or basket. Men inside the weir advance toward the closed exit, pounding the surface of the water with coconut midrib butts to drive the fish to the exit where they are caught. The fish caught in these weirs are the same as those caught in stone weirs.

Movable coconut-leaf sweeps (*pa lama launiu* or *kupenga lama launiu*) are used in the lagoon:

Bundles of dried half coconut leaves are fastened together to make a long sweep about 18 inches high and 20 to 30 fathoms long. The sweep is carried to the lagoon and used to surround (*liva*) a lagoon pool where the water is about knee deep. The wings are drawn together (*wawuti* or *laulau*) and the fish clubbed or speared. Alternately the sweep is dragged over shallow water to the beach. Small fish are swept onto the beach or caught in the interstices of the midrib sections. The sweep is shaken out on the beach to dislodge the fish. Fish caught by this method are: *kaloma, tete, mamea, ie, awaa, katimu, lupo,* and *atule.*

Semi-permanent fish runways (*alai lama*) made of *pa lama launiu* set between rows of stakes are used in the Yato fish pool at the causeway. These runways accustom the fish to go toward places where the fishermen set nets or lines when the tapu is raised from the pond and it is open for fishing. Rougher runways are made by placing bundles of coconut leaves in the water and weighting them down with heavy stones.

NETTING

A net full of fish is *puto ika.* The use of nets in fishing is limited to the hand fishnet (*tae yaeke*), seine net (*kupenga*), arched net with line (*tata tiwitiwi*), long-handled dip net (*tae malolo*), and the flying-fish practice net (*tae penu*). (See pp. 208-209).

[227] 1. The hand fishnet (*tae yaeke*) is shaped like the *tae malolo* but is much larger, having a larger mouth and longer handle. I did not see one in use. It is employed as a scoop net to block up the seaward faces of short reef channels (*yi*) or of long reef

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

channels (*awa*) leading to the open sea. Suitable channels on the reef shelf through which the water from the lagoon flows back to the ocean with the ebbing tide are blocked (*yuuke*) and the fish caught. Fish caught by this method are the common reef and beach fish mentioned for weir trapping.

2. The seine net (*kupenga*) is used for beach and reef fish. Because the irregular coral bottom of the lagoon would soon rip the meshes of the net if dragged over the bottom, it is set, not hauled, for reef fish. Nets used for the small beach fish (*kalouna*) are dragged over the sandy bottoms close to the beach. Nets for reef fish are set on the seaward side of the reef shelf. Some men walk inward with the wings of the net while others on the lagoon side of the reef shelf walk seaward, beating the water with coconut-leaf butts to drive the fish toward the net. The wings are closed around the fish, which are clubbed to death in water about 4 feet deep. To use the seine net, whether by setting or hauling, is *yali kupenga*. The one net on the island at present is owned by the men of Ngake who sometimes use it on the reef off Ngake, at other times on the reef off Yato. When it is set off Yato, Yato men are always present; and the fish caught are fairly divided among the men of the two villages. Fish caught by this method include all the reef fish caught by spearing and by fish weirs.

3. The arched net with line (*tata tuvitivi*) is used for reef fish. It is constructed on the principle of the Samoan arched net with line (*27*, pp. 477-478), but with different materials. As I did not see one in use, the description is based on informant's account. A special net is not made; the net from the *tae malolo* is unlashed and used. It is laid flat on the ground. A sennit cord passes from each of the four corners of the net to make a sort of bridle which takes the place of the thin rods used in the Samoan net. To the apex of this bridle is fastened a hand line of sennit. The surface of the net is baited with *Tridacna* meat, and *Tridacna* shells are placed on the net mesh to act as sinkers. The net is let down from a canoe and laid on the bottom (*wolowolo*) in about 2 or 3 fathoms of water. The fisherman then dives to the bottom to spread out the net. When coral or reef fish swarm into the net to get the bait, it is quickly pulled up. The natural sag in the *tae malolo* net is increased as it is drawn rapidly to the surface, making it a fairly deep bag net.

4. The scoop net (*tae malolo*) is used from a canoe on the outside of the reef to catch all kinds of fish. The classic example of this type of fishing is flying-fish netting. The best time to catch flying fish is after a big squall (*timu ongo*) which has the effect of bringing together the fish. Flying fish are sometimes caught by individual fishermen in single canoes, more often by a fleet of canoes (*uwa vaka*) which goes out by arrangement to fish competitively. For the purposes of this fishing, members of the crew are named according to the functions they perform. In a six-seater canoe (*yuke ono*) the crew members, starting from the steersman and moving toward the bow are: the captain, who is steersman and principal netter (*tae muli*); the *wulimuli* ("mate"), who has charge of the canoe when the *tae muli* is netting but paddles at other times and is also referred to as *te ola no te tae ewi*, because he gathers together the fish as the netter throws them into the canoe; the *tae ewi*, who paddles and also nets when the canoe is on a big shoal of fish; the *o loma* or *te tata yua*, who paddles, bails, and gathers in the fish thrown by the second netter and is also responsible for the torches (in a six-seater canoe there is one torcher; in an eight-seater, two torchers); the *ola no te ulu* or *te totowi*, who paddles and gathers the fish together and who with the second man (*wulimuli*) is responsible for keeping the canoe straight to the reef and moving it as required when the other members of the canoe are netting or bailing; the *tae uma* or *tae ulu*, who paddles, acts as a netter, and is responsible for warping the canoe (*lolo te vaka*) as it is swung head-on to the reef, so that the canoe is kept dead head-on to the reef and swings neither right nor left from this position. In smaller canoes with a crew of only three men, the netter is in the bow, the torcher in the center, and the steersman in the stern. Previously only men fished flying fish, but today women and girls occasionally go out with the fleet to act as paddlers and torchers.

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukan

226 The canoes of the fishing fleet line up outside of and parallel to the reef. The leading canoe (*iki*) turns toward the reef, pointing bow-on to the reef. The torcher in this canoe raises his torch so that it bursts into flame (*wakayila te lama*). All the other canoes in succession turn bow-on to the reef and raise their torches. The fishermen make booming noises by beating the washstrakes of their canoes with their hands, and produce loud sibilant sounds by sucking in the breath quickly through pursed lips. These two sounds, together with the glare of the torches, attract the fish to the surface. They skim through the air and are caught by the netters, who net on the starboard side of the canoe. As soon as the shoal of fish has been caught or frightened away, the torches are lowered and allowed to smoulder. The canoes turn parallel to the reef again and paddle farther along. The last canoe in the line now races up from behind the fleet and takes its place at the head of the fleet (*wakalaka te vaka muli ki mua*). Each canoe in turn leads (*iki*) the fleet until all canoes have had their turn as leaders of the line. When the last canoe has reached the lead, it turns toward the reef and raises its torch. All the canoes follow suit, and the whole process is repeated. During an evening's fishing along the western reef, the canoes work down the reef from Wale until they are opposite Motu Kotawa or Motu Ko. A canoe which has an expert netter may catch about 200 fish during an evening's sport.

Fish caught by the scoop net on these occasions are: *ie pa, yipa, aku, malolo, ngalio, hupakupa, maske, matauli, uli, uo,* and *vitiviti*. All these fish, save *ie*, of which the schools are so big that the fish is easy to catch, and *aku*, which is a very big fish, are counted as scoring fish in village flying-fish competitions. The height of the flying-fish season is from August to December.

ROD ANGLING

Angling, a common Pukapukan method of fishing, is of three types: beach angling, reef angling, or stationary canoe angling inside or outside the reef. The type of rod and hook used depends on the fish to be caught.

1. In beach angling the fisherman usually uses the *mutila haloma* rod and small *yeki* hook. He stands on the beach or in the beach shallows and casts his hook into the shallow waters. Women, as well as men, are skillful beach anglers. Small fish are caught by this method. All members of the *haloma* and *vete* family are caught with a *yeki* hook, with bait of red *unga* crab and chum of *kaipea* crab. These fish are caught in daytime throughout the year. They are especially abundant at the new moon, during the southern solstice, and after a thunder storm. Other fish caught are: *manini, papata, hata, hatuli, lupo,* and *uli*. The bait and chum are those used for *haloma*.

2. Reef angling includes angling from the reef shelf where the hook is cast on the outside of the reef, angling on the reef shelf itself, angling on the inside of the shelf where the hook is cast into the deep water of the lagoon, angling from coral heads inside the lagoon, and angling from the lagoon. In lagoon angling (*wakalukuluku*) the fisherman stands in water up to his neck. Holding the rod with one hand, he submerges his head to look for fish and then casts the hook in the direction of the fish.

[227] The rod used in these methods is the *matila petuki*, which is about the same in size as the *matila akuaku* (p. 187). The type of hook varies for the kind of fish to be caught. Fish caught and hooks and bait used are:

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

226
227

A float (*makai*) used for catching flying fish from a stationary canoe was described by informants:

The float consists of a section of *mahoaoa* wood about 9 inches long and 3 inches in cross section. To each end of the float is fastened a line ranging in length from 18 inches to 6 feet. The two lines on the same float are of unequal lengths to avoid tangling when fish are hooked. Each line has a *yeki* hook which is baited with *unga* crab, *haloma*, or flying-fish meat. Several floats (*makai*) are allowed to float unattached around the canoe. When a float begins to bob, the fisherman paddles to it, disengages his fish and resets the float. Chum of *unga* crab meat is used to attract the fish to the float. The only fish caught by this method are members of the flying-fish family: *yipa*, *malolo*, *malolo puna ahiu*, and *malolotyae* (large-bellied balloon *malolo* fish which is not eaten and only caught incidentally).

STILL-CANOE FISHING

226

Still-canoe fishing with a vertically descending line and dead bait is termed *tasalo*; similar fishing with live bait is called *lulu*. When the *tasalo* system is used with a *yeki* hook for small fish, the method is called *yekiyeki*. In both types of fishing not more than 50 fathoms of line are paid out and the canoe is anchored inside or outside the lagoon.

[502]

Outside the reef the canoe is kedged onto the reef. The anchor line (*kaasatae*) is buoyed up from reef to canoe with dry coconut husks. A quarter husk is split longitudinally for about 6 inches and the line wedged into this split. The natural spring of the husk serves to keep the line fast. About 12 husk buoys (*pulu langalanga*) are used for each 100 yards of anchor line. Several canoes fishing together are lined up in single file. The first canoe is kedged to the reef, and each of the other canoes is attached by about 10 yards of anchor line to the one in front. Canoes are kedged to the reef only in an offshore wind. Canoes anchored inside the lagoon are usually kedged with two anchors (any large stone serves as anchor), one at the bow, the other at the stern. In both *tasalo* and *lulu* fishing the canoe is faced to windward, and the line is dropped in the lee of the canoe. Both types of fishing depend for success on an ability to see the fish biting the hook. To make the leeward surface of the water calm and devoid of surface rippling, the fisherman chews coconut flesh, which he spits on the sea. The oil in the flesh spreads over the water and effectively calms it. Today a waterglass is often used instead of chewed flesh. Some fishermen prefer to fish the smaller lagoon fish when the sky is overcast and likely to rain, using composite shell hooks. Where *Tridacna* is used as chum, the backs of the opened shell are rubbed together, making a grating noise (*kulukulu*) to attract fish; the two half-shells with meat attached are thrown into the water near the canoe. Fish caught by the *tasalo* method are:

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

2.26

Fish Caught	Hook	Bait
Eve, uuliki, talao	Yeki or tope	Kaloma, ie, or crab
Ukoako	Tope or small composite hook	Crab or kaloma
Parrah fish	Yeki	Tridacna, crab, or seaweed
Paleva, peva, lai, and lalawata	Tope or composite hook	Dead kaloma
Una, palangi, malava, kayuye, ena, and maiko	Yeki	Crab, kaloma, or Tridacna
Malali and lalawi	Tope	Unga and kaloma
Malatea and oalo	Wooden hooks	Tridacna, octopus, or sea urchin (vana)
Wankale, lalaua, tiwitiwi, talaua, lauauaui, yaava, tititaeyiau, taiva, kakili, kili, aualeuga, yiaua, atula, rock groupers, waputea, and pakeva	Plain or barbed tope	Crab or kaloma (grouper papa best caught with bait of flying fish or octopus)
Sharks (occasionally when troubling albacore fishing; not eaten)	Large wooden hooks	Any dead bait

The method of attaching dead bait (*mauua wate*) to any type of single-piece fishhook is shown in figure 4, *a*. Live bait used in *lulu* fishing is any small fish. The point of the hook is passed through the back of the fish or the fish is tied to the hook shank by the bait string (*takele mauua*) so that it wriggles about in the water. *Kaloma* bait is preferred in *lulu* fishing for the fish also caught by the *tauala* system, except for *ulua* and *lai*, which bite best with live *matolo* bait on a wooden hook. *Kauuli* is fished only at night with a composite hook. *Lai* is fished only at night in the full and new moon, with *tope* hook. For *lulu* fishing the bait is caught before the planned expedition and kept alive in a submerged basket tied to the cross booms at the side of the canoe, within easy reach of the fisherman. The mouth of the basket is securely fastened to prevent the escape of the bait fish.

2.27
284

A special method of attaching sinker to line is employed in *lulu* fishing for *kakai* and *pala* fish:

The hook (*uuhaolo*) is barbed. A secondary snood (*mataa*) of two- or three-ply twisted *uoo* fiber about 7 feet long joins the hook to the fishline of sennit. Unlike sennit which hardens in water, *uoo* line becomes soft and slips easily from the sinker when knotted. Live bait of *kaloma* or *atula* is fastened by the tail to the shank of the hook. Hook and bait are laid on the surface of a smooth coral stone sinker, and chum placed on top is covered by a *puapua* leaf so that it will not scatter until the requisite depth is reached. The *mataa* snood is passed around the sinker away from the barb of the hook, making two or three transverse turns to secure both hook and bait. The *mataa* is then caught in a bight with the left hand and passed around the sinker once in the opposite direction, passing over the right thumb that holds the first transverse turns in place. The bight and the running part of the *mataa* are tied together in a single overhand knot; sometimes a single slip noose is made on top of this overhand knot. Hook and sinker are paid out until the required depth is reached, when a sharp jerk on the line releases the sinker which falls away, leaving the hook, bait, and chum at a favorable depth.

2.26

Many men go outside the reef two or three times each week to catch *kakai*, the fish usually caught in fishing competitions. *Kakai* fishing is the favorite deep-sea fishing of the Pukapukan today:

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

A man catches his *kaloma* bait in the morning. Besides his fishing gear and two or three coconuts for his day's lunch, he takes with him coconut-leaf mats (*pola launiu*) which provide protection from sun and rain and serve as sails. A mat leaning against the fisherman's back while he waits for a bite is easily thrown aside when strenuous activity is required to haul up the fish on the line before the sharks can take the fish from the hook. When the canoe is kedged to the reef and there is only a gentle breeze blowing offshore, a mat sail is used to prevent drifting onto the reef, thus obviating the necessity of paddling out from the reef again and again. A big sail in a fishing canoe would be cumbersome and would catch too much wind. A mat standing up in the canoe, with vertical midrib base and light guys running to outrigger booms providing support, gives sufficient belly to catch the wind and keep the canoe off the reef without dragging anchor.

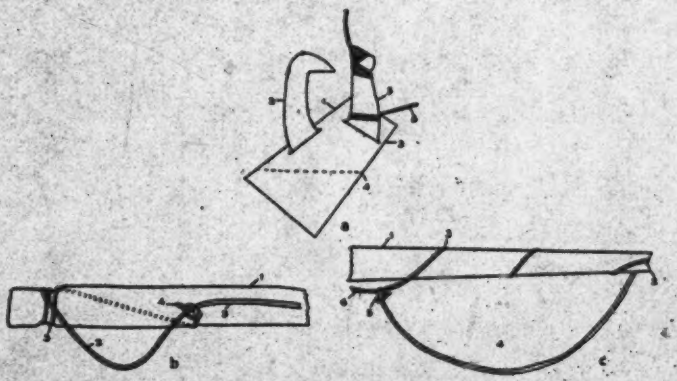

FIGURE 4.—Implements for fishing and bird noosing. *a*, fishhook with bait attached: any dead fish bait (*mauna mate*) is attached to old style hook by removing head from bait fish and stripping off fillet (1), excluding backbone from belly backward so that flesh remains whole; hook (2) thrust through tail end (3) of fillet from flesh side, back through head end of fillet from skin side; fillet folded (4) along hook (dotted line), flesh side outward, skin side inward, and tail end of fillet lashed to shank (5) of hook, near shank knob, by transverse turns of bait string (6), fastened with half hitches. *b*, bird noose (*yele mauu*): pole (1) about 12 feet long, 2 inches in diameter; noose (2) two-ply twisted sennit; one end of sennit passed transversely around notch end of pole (3), then down underneath two transverse turns; short free end (4) tied in square knot on bight; running end (5) passes down pole to bird catcher's hands at proximal end. *c*, fish noose (*kauyele*) (C8152): wooden support (1) of *puapua* wood about 6 feet long, ½ inch in diameter at proximal end, ⅜ inch in diameter at distal end which is notched (2); noose cord (3) of strong, three-ply twisted *uuo*, wound around support, passed over notch (2) to form noose (4); free end knotted on bight (5) and cord (6) passes to proximal end of support.

Tuku moana fishing from a stationary canoe outside the reef with dead bait differs in two respects from both *lulu* and *tauala* fishing: *tuku moana* fishing is deep-sea hand-line fishing up to about 300 fathoms and involves

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SHELLFISH

227 *Tridacna* shellfish (*payua*) is obtained from the lagoon corals with the aid of a cutting implement (*kalo payua* or *maniu-payua*) of *ngangie* wood about 12 inches long. One end is a double-edged, pointed, sharpened blade (*kalo*). The other end (*kalokalo*) is square and has a cutting edge on one side only. Between the two blades is a smooth section of wood used as a handle. Today a piece of iron with wood lashed along the median line is [883] preferred to the wooden implement. Both men and women procure *payua*. Groups of girls or mixed parties of young men and girls go shellfishing to- 226 gether. An outrigger is often taken out from shore to act as a float.

By one method the fisherman dives for *payua* in deep water. He cuts the membranes on the two open half-shells with a twist of the *kalo* blade of the knife to prevent the shell from closing. Then with the *kalokalo* blade he makes a circular sweep around both shells and severs the flesh from the shell. He brings the flesh to the surface, leaving the shell below the water. The flesh is placed in a basket tied to the outrigger float. Considerable skill is required to remove *Tridacna* meat with the implement in the time the fisherman can remain submerged.

Another way to procure *payua* is to swim or canoe out to the coral heads of the lagoon and pry (*supenapa*) the shells from the coral with a digging stick. Today an iron crowbar is preferred for this work. The shells are loaded into the canoe and brought ashore, where the flesh is cut out with a *kalokalo* or knife. On coral heads in the lagoon close to Motu Ko are huge piles of *Tridacna* shells (*ngalipayua*) which testify to the value placed on *payua* meat in past times.

226 The flesh of the pearl shell (*wua ni*) is not eaten. The shells are grasped 321 in the hand and twisted so as to break off the tentacles anchoring the shell to the coral. Pearls were of no value when found inside the shell and were commonly thrown away.

The general name for clams is *pipi*. Various varieties are *pipi yeyenga*, *pipi kula*, *pipi tonga*, and *ngu*. They are not eaten but the shells were [413] formerly valued for cutting implements, coconut graters (for which the clam *ngu* was used), talo scrapers, and occasionally for lancets in surgery.

Periwinkles (*alili*) come over the reef in large quantities at the full of 126 the moon and are especially numerous during the time of the morning rising 262 of the Pleiades. They are collected on the reef by hand by children and adults and form an occasional article of diet, roasted in the shells. The flesh is pulled from the shell with the fingers or a pointed stick. Periwinkles are considered hard to eat and not very satisfying but pleasant enough for a change.

REEF CREATURES

136 Reef creatures found on Pukapuka but not eaten, though sometimes caught on other Polynesian islands for food, are sea porcupines, of which the Pukapukan names four: *wetuke* (a blunt-spined sea porcupine); *tuna* (a

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Scrapers and Rasps

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Scrapers for smoothing wood were formerly selected pieces of coral (*punga*) with rough surfaces (*talatala*). The smoothing (*oloolo*) was done with the wooden object submerged in sea water in order to soften the wood. The first scraping was with the *punga* coral, the finishing scraping with a piece of *kana* coral which has a surface covered with tiny, sharp "teeth".

The use of wood scrapers to which shark or ray skin is lashed is modern in Pukapuka. Informants stated that although shark skin was used formerly for fashioning pearl-shell hooks, the idea of using it for smoothing wood was introduced from Samoa.

WORKING OF SHELL

227 321

Mother-of-pearl shell is termed *ui*. Other bivalve shells of about the same size and shape as pearl shell are also termed *ui* with an added adjective, as in *ui pakayau alongo*, to distinguish them from true pearl shell. Pearl shell is procured by grasping the shell with the hand and twisting it to break the tentacles. Thick shells were used for composite pearl-shell hooks, thin shell for ornaments and for single-piece shell hooks.

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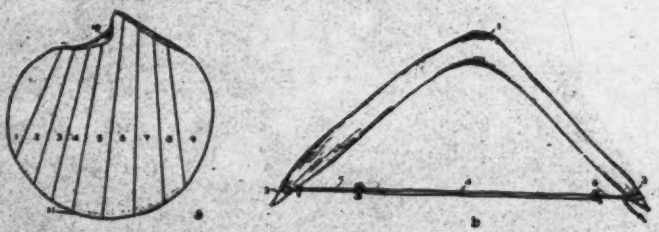

Figure 23.—Division of pearl shell; shell file. *a*, shell regionally divided into nine sections by cutting radially from hinge (10) to lip (11): preferred shanks for composite hooks cut from sections 4 to 7, other shanks from sections 1 to 3, 8 and 9; shanks for small composite hooks, single-piece hooks, and shell points for composite hooks cut from lip half of shell; named sections: 1, *tawa*; 2, *patawa*; 3, *pa ki te mua*; 4, *wyololoto*; 5, 6, 7, *wyoloto*; 8, *iyumotu*; 9, *okowa*. *b*, shell file (*kamea*) of shark skin (C8037): 1, frame, small branch of *wahamaru* wood with limbs 11 and 9 inches long; 2, 3, ends of limbs pointed and notched; 4, curled shark skin, 9⅝ inches long, ¾ inch diameter; 5, 6, suspension cords of two-ply twisted sennit, knotted to ends of shark skin, passed transversely around ends of limbs three times and knotted.

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The whole pearl shell (*itu ui*) is regionally divided by the Pukapukans into nine named parts (fig. 23, *a*). Radial sections cut through the hinge of the shell along these regional divisions are used for the shanks of bonito trolling hooks; the lip ends of these radial sections are used for small composite hooks and for bonito points.

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

for judging this amount, but said that they judged by the eye. Kennedy discovered from a study of canoes of Vaitupu that the "limiting amount by which the forward end of the float is set to starboard is about one hand's breadth from a line through the after end of the float parallel with the hull" (19, p. 94); this amount agrees closely with the Pukapukan average for this starboard set, though there seems to be little correlation between the size of the canoe and the amount of starboard set considered necessary. The required balance weight of the float seems to be obtained almost entirely by lengthening the float, for the width and depth of the float do not vary greatly save for the larger canoes. The length of the float in relation to the overall length of the canoe indicates that the Pukapukan builders unconsciously judged the float length by some such rule as Kennedy (19, p. 79) gives for Vaitupu where the outrigger is given a length such that the forward end will be laterally opposite the feet of the bow paddler and the after end opposite the feet of the rearmost paddler. Again, Pukapukan builders could give no rule for judging the proper length of the outrigger float save an eye judgment.

Table 3. Canoe Measurements

Type	1 Overall Length	2 Beam (Gunwales)	3 Beam (Hull)	4 Depth (Center Canoe)	5 Length, Forward Canoe Body	6 Forward Canoe Body, Hull to Outrigger	7 Rear Canoe Body, Hull to Outrigger	8 Length, Longitudinal Spar	9 Length, Outrigger Float	10 Width, Depth, Outrigger Section	11 Length, Steer Piece (Tip to Gunwale Join)	12 Length, Bow Piece (Tip to Gunwale Join)
Single dugout (large)	16′	14″	14″	16″	7′ 3″	6′ 3″	6′ 7″	9′ 10″	12′	5½″×4½″	—	—
Tatai tokatai — one-man canoe	10′ 6″	10″	8″	17″	5′ 5″	4′ 7″	4′ 9″	6′ 4″	7′ 8″	5″×3″	—	—
Tatai tokalua — two-man canoe	19′	11″	9″	16″	6′ 6″	5′ 7″	5′ 10″	9′	13′ 3″	6″×4″	4′ 3″	3′ 9″
Yeke tolu — 3-seater	16′ 6″	11″	7″	15½″	5′ 6″	4′ 10″	5′	9′ 6″	12′	5″×3½″	3′ 6″	3′ 7″
Yeke va — 4-seater	21′ 11″	14″	11″	18″	6′ 6″	4′ 8″	5′ 1″	10′ 4″	16′ 4″	5½″×4″	3′ 11″	3′ 4″
Yeke ono — 6-seater	35′ 6″	15″	11″	20″	8′ 1″	5′ 10″	5′ 10″	18′	22′ 6″	7″×6″	5′ 2″	6′ 7″
Yeke iva — 9-seater	51′	22″	14″	27″	8′ 8″	7′ 8″	8′ 2″	27′ 6″	32′ 8″	7″×7″	—	—

FISHING EQUIPMENT

Besides fishnets (p. 208) and hooks (p. 191), fishing equipment includes lines, fishing rods, composite fishing apparatus, clubs, fish spears, and hook containers.

Fishlines

Lines of *uao* fiber are used on composite pearl-shell fishhooks where quality rather than length of line is important. Three-ply braided sennit

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

226 lines are used for deep-sea fishing where both length and strength are desirable. These are made in three lengths, each from 50 to 75 fathoms long. The three lengths, called respectively *kawa lalo, kawa loto, kawa lunga* (sennit bottom, middle, top), are tied together with prominent knots. In paying out his line the fisherman feels the knots as the line runs through his hands to gauge the depth at which he is fishing, and is then able to fish at the depth at which he believes the particular fish bite best. Anchor lines of thick three-ply sennit braid are in continual use for deep-sea fishing. For tiny fish such as *lupo* a line of single pieces of coconut fiber is used with a gorge of pandanus spine.

227 284 One such line (C8043) wound round a wooden holder consists of 34 lengths of coconut fiber, each about 10 inches long, knotted together; the line is finished with one length of very fine two-ply twisted *nuo* and a snood of the finest single ply twisted *nuo*, total length being 32 feet.

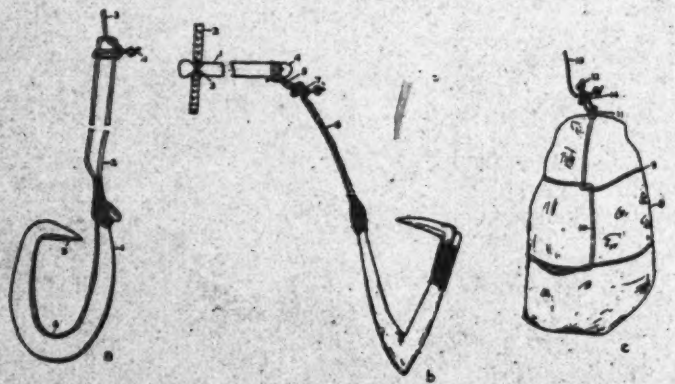

FIGURE 33.—Fishing equipment. *a*, attachment of double snood to fishline (shown diagramatically): looped double snood (2) lashed to shank of coconut-shell fishhook (1) with descending figure-of-eight turns; end of fishline (3) knotted (4); free end passes around loop and back on far side of loop, then over near side, through top of loop and pulls tight. Coconut-shell hook (*tope ngaipu*) (C8186) 3⅜ inches high, 1⅜ inches in greatest width with point-shank clearance of ¾ inch; bend ⅜ inch wide, ⅛ inch thick; inner edges of point (5), bend (6), and shank (1) beveled slightly. *b*, composite fishing apparatus (*taumakomako*) (C8190): spreader stick (1) attached to secondary snood (2); snood lashed with diagonal turns (3) of fine *nuo;* at distal end of stick (4), short piece of *nuo* (5) doubled and lashed to stick with transverse turns; snood (6) of hook is knotted to doubled *nuo* (7); wooden hook (*kau*) small with scarf join accentuated. *c*, sinker for apparatus: sinker (8) block of coral (*punga*); one end of anchor line (9) makes two transverse turns around sinker, other end (10) caught by turns; at top, two free ends fasten with double overhand knot (11), then looped, and ends fastened again with overhand knot (12); sinker line proper (13) from fishing apparatus knotted in loop (14).

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

227/284 Secondary snoods (*matai*) are made of twisted *wao*. They are either single or double. Single snoods are fastened to fishline by knotting. Double snoods seem to be a feature of coconut-shell fishhooks. The attachment of these snoods to the fishline is shown in figure 33,*a*.

Many lines used in fishing from the beach (*wakamoe* system) are wound on a wooden holder (*muli pokai*), their hooks supported by floats.

Rods

226/284 For *kaloma* fishing, reef and lagoon angling, and trolling with a composite pearl-shell hook, the fishing line is attached to a rod (*matila*). The total length of fishline attached to the rod is several feet longer than the amount of line necessary for a cast.

The fisherman judges the length necessary for a cast and makes at this point a clove hitch round the distal end of the rod. The free end of the attachment line he carries down the rod, making a single transverse turn with a single overhand knot round the rod at equal intervals. Toward the proximal end of the rod, he makes several transverse turns round the rod and fastens the free end of the line to the standing line with an overhand knot. For carrying to and from the fishing ground, the casting line with hook attached is laid along the rod, a transverse turn fixed with a single overhand knot is made round the rod toward the proximal end, and the free end of the casting line carried up the rod again; the hook is caught in one of the transverse turns made round the rod by the attachment line.

227/284 The *kaloma* rod, *matila kaloma* (C8137), is made of *puapua* wood, 4 feet 6 inches long, ¾ inch in diameter at the proximal end, ⅜ inch diameter at distal end. The line is very fine two-ply twisted *wao* (about the thickness of no. 50 cotton thread). The casting line is about 4 feet 6 inches long, the attachment line 14 inches long.

A larger fish rod for needle fish (*matila yi akuaku*) and reef fish is also made of *puapua* wood (C8098); it is 8 feet 9½ inches long, ¾ inch in diameter at the proximal end, ¾ inch in diameter at the distal end. The line is fine two-ply twisted *wao* (about the thickness of coarse thread). The casting line is 12 feet long, the attachment line 5 feet long.

The attachment of bonito hook line to the bonito trolling rod (*matila atu*) is by a clove hitch to the distal end of the rod. Where more than one hook is attached to the same rod, the several clove hitches are fastened round the rod below each other (fig. 34,*a*). The bonito line, of thick three-ply twisted *wao*, is about 20 feet long and is attached to the rod at a point about 10 to 12 feet from the hook, depending on the length of casting line that the fisherman desires. The free end of the line is wound round the rod with oblique downward spiral transverse turns and tied about the middle of the rod with an overhand knot. The free ends of several attached hooks wound thus round the rod produce a pleasing pattern lashing on the rod.

The bonito rod is fitted into a wooden handle (*tukau*) which has an upper grooved part into which the proximal end of the rod fits, a raised flat projection (*malae tukau*) covered with netting, and a handgrip (*muli tukau*) at the end. The shape of the handle and the method of lashing the rod are shown in figure 34,*b*. The completed lashing resembles the completed Samoan lashing of bonito rod to handle (27, p. 503) though the technique of lashing differs slightly.

The netting covering the flat projection above the handgrip is made by the ordinary netting technique and is fastened round the handle by transverse cords that pass through the marginal meshes above and below the projection. When lines and hooks are attached to the rod, the casting line is carried down the rod and the hooks caught through the

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

227
284
[226]

netting meshes. For use, an appropriate hook is selected, disengaged from the netting meshes and allowed to hang free from the distal end of the rod. If fish do not bite this hook, it is replaced in the net and another hook disengaged. With six or more hooks attached to the rod at one time, the fisherman is able with maximum speed and minimum trouble to select the hook which the fish prefer to bite.

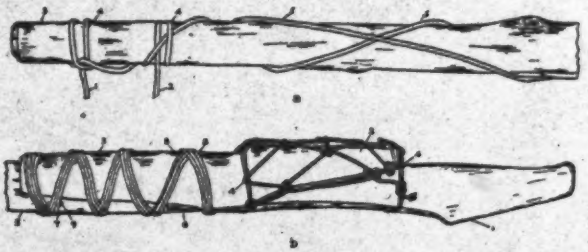

FIGURE 34.—Bonito rod. *a*, attachment of casting line: 1, 2, casting lines attach two hooks to distal end of rod (3); 4, clove hitches made around end of rod; casting lines hang free; attachment lines (5) wound spirally around rod and fastened halfway down rod. *b*, attachment to handle (*tukau*), side view: 1, handle of *mukamava* wood with handgrip (*muli tukau*); 2, raised flat projection (*malae tukau*); 3, hollowed out upper part; raised projection covered with netting (*epa*) fastened to handle by cords passing through marginal meshes (4); rod (5) pushed into hollowed upper part, chocked if necessary with small wedges of wood (6); lashing of three-ply braided sennit commences with buried end (7) at upper end of handle, then wound around handle and rod descending spirally, then up handle and rod ascending spirally; continues alternate spirals, descending and ascending, for three turns each way (8), and finishes with buried end (9).

Nooses

Noosing apparatus consists of a line of three-ply twisted *uso* about 18 feet long and a stick (*kau*) by which the noose is brought near the fish.

The stick (C8152) is of *puapua* wood, 6 feet long, ¾ inch in diameter at the proximal end, ⅜ inch in diameter at the distal end (fig. 4,*c*). The distal end is notched to provide a running groove for the line on which a running noose (*matapili*) is made with a slip noose (*mayi*). Line and handle together are termed *kauyele*.

Composite Fishing Apparatus

For deep-sea hand line fishing from a stationary canoe outside the reef (*tukumoana* system), a composite fishing apparatus (*toumakomako*) consisting of a number of hooks attached to one line is used.

Of two types of *toumakomako* in use, one (C8190) has a secondary snood (*matui kauru*) of three-ply sennit 6 feet 8 inches long. At a point 2 feet from the proximal end of this snood a *ngangie* spreader stick, 5¾ inches long, ¾ inch in diameter, is lashed. The proximal end of the stick is grooved circumferentially and the snood fastened to the stick by four oblique transverse turns of fine two-ply twisted *uso*, followed by three circumferential turns between stick and snood, the finishing end being buried

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

227 in three transverse turns round the snood (fig. 33,*b*). Five spreader sticks 9 inches apart are attached to the snood in this way, being lashed so that the distal ends of the sticks project alternately to the left and to the right of the snood. The distal end of each spreader stick is also grooved circumferentially, and a length of twisted *wao*, 1¼ inches long, is doubled and the free ends fastened to the spreader stick groove by transverse turns of fine *wao*. To this double spreader stick snood, the fishhook snood proper is fastened by the method of knotting illustrated in figure 33,*b*. Five fishhooks are attached to the five spreader sticks. By making these sticks project alternately to left and to right, the danger of tangling the hooks in use is avoided.

Informants mentioned another type of *taumakomako* formerly in use. It consisted of two crossed spreader sticks of *ngangie* wood, each stick about 18 inches long, with a cross section diameter of about 1½ inches. To the ends of each spreader a snood was seized. The four snoods ranged in length from 2½ to 6 feet so that four fish caught on wooden hooks knotted to each snood would not tangle the snood lines. At the intersection of the spreaders, a sinker line (*kowatou tuku maene*), 12 inches long, was fastened to suspend the sinker (*maene*) of *punga* coral. Also at the intersection of the spreaders was knotted a secondary snood (*matai*) 12 feet long. To the *matai* was fastened sennit fishline about 200 fathoms long.

Sinkers

[226] For fishing at moderate depths of 50 or 75 fathoms, sinkers (*maene*) consist of any coral stones of suitable weight picked up on the beach. Because these sinkers are disengaged from the line and fall to the bottom when the hook has reached the required depth it is pointless to use any but rough stones. In *tukumoana* fishing, one sinker weighing about 9 pounds is used repeatedly. Even for this the Pukapukan fisherman has apparently felt no incentive to make well-shaped or bored sinkers. He chooses as a sinker stone a block of coral that is roughly rectangular or cone-shaped. If the surface is not rough enough to hold the sinker line without slipping, it is chipped slightly to form two transverse grooves into which the sinker line fits. This line is attached to the sinker by transverse turns and knotted to the secondary snood (see figure 33,*c*).

Fish Club

227 Fish clubs (*patu iko*) are made of *ngangie* wood; their size and weight depend on the fish which it is proposed to kill with them. A small club is used for *patuki* and other reef fish caught in reef angling or canoe fishing.

This club (C8163) is shaped like a small talo pounder with a blunt proximal end. It is 16 inches long, 2 inches in diameter at the distal end, 1 inch in diameter at the proximal end. The distal end is slightly convex. The club weighs 1¼ pounds. Larger clubs weighing up to 5 pounds are used for larger deep-sea fish. Today a section of iron bar is often used as a fish club.

Hook Containers

[415] When not in use, small, valuable single and composite pearl-shell hooks are kept in the house stored in the double satchel (*tuluma pa*) described elsewhere (p. 134). Hooks and small fishing gear when taken into a canoe are kept for safety in a coconut-shell container (*pupu*).

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

227
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An example of this type of container (C8093) is a smoothly polished coconut shell, the eye end of which has been cut off to make a container 4 inches high, 2¾ inches in diameter at the mouth. The mouth is covered with another half coconut shell (*pupuni*), which fits tightly over the container.

Fishbone gorges used in fishing needle fish are kept when not in use by sticking them into a gorge cushion (*pupu au*) which consists of a small cylindrical section of shaped coconut husk. The gorge cushion may itself be kept in the coconut container by the fisherman out in his canoe.

227
284

FIGURE 35.—Fishing equipment. *a*, fish spear (*tao iko*) (C8125): 1, shaft of *puapua* wood 10 feet 3 inches long, diameter at proximal end (*mulimuli*) ¾ inch, widest diameter of haft 1¾ inches; 2, 3, barb (*uabatala*) of *ngongie* wood, 1 foot 9 inches long, ¾ inch diameter; 3, point (*mata*) of barb 2 inches long, cut in ½ inch; sharpened stem of barb forced (5) into pithy core of *puapua* wood for 3 or more inches and held tight with 73 turns of two-ply twisted sennit (4); commencing and finishing ends buried; at point (5), observable projection above lashing of haft. Second fish spear, examined in field, was one-piece point and haft of *ngongie* wood, 8 feet long; barb 6½ inches long; proximal end finished with small terminal knob. *b*, gorge of pandanus spine (*matatala*) (C8043): 1, 2, two spines (thorns) stripped from pandanus leaf and placed together so that barbs project on either side; spines joined together by snood (3) of finest *uso* fiber with two pairs of half hitches (4, 5); 6, free end of snood serves as bait tying string (*takele mauna*); length of gorge ½ inch, width ⅛ inch.

Fish Spear

Most fish spears in use today are thin iron rods or wooden shafts with iron points. Formerly both shaft and barbed point were of wood. A typical spear is shown in figure 35,*a*.

Gorges

Two types of gorge (*au*) are in common use: one of fishbone is used for catching the needle fish; the other, of pandanus spine, is used for the tiny *lupo* fish.

The fishbone gorge is a bone of the *talao* fish about 1 inch long. The snood of fine two-ply twisted *uso* (*alaala*) is fastened to the hook below the head by four half hitches (*uo yelenga*). The free end of the snood serves as a bait string (*takele mauna*).

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

227 A bait of *kaloma* flesh is wrapped round the bone and the bait fastened with several turns of the bait string. When not in use, the gorge is pushed into the gorge cushion. The gorge of pandanus spine (*matatala wala*) is described in figure 35,*b*.

Hooks

Pukapukan fishhooks are made of wood, coconut shell, pearl shell, and turtle shell. The generic name for a wooden hook is *kau*; for a shell hook, *patala* or *matau*; for a composite hook, *pa*. Single-piece hooks are further named according to their size and shape. The hook is conveniently divided into shank, bend, point limb, and point. The Pukapukan equivalents for these and other terms are shank or point limb, *kaukau*; outside of the bend, *muli*; inner curve of bend, *liu*; point, *mata*; barb, *wakatala*; shank knob, *loke*; terminal or proximal end of shank above knob, *tileo*.

227 284 In use, each hook has a snood (*taka*) lashed to the proximal end of the shank. The end of the three-ply twisted or braided snood is unravelled and laid against the inner side of the shank knob with the end of the braided section resting against the proximal end of the shank. One ply is placed to the right; the other two plies, which are treated as a single element, to the left. The first ply is passed transversely round the shank to the right, under the knob on the outer side, then round to the inner side again to pass diagonally upward to the snood where the free end of the ply is laid against the braided portion of the snood. The other two unravelled plies pass to the left, transversely round the shank, under the knob but on top of the already wrapped first ply, round to the inner side of the shank to pass diagonally up to lie against the braided portion of the snood.

The lashing of snood wrapping to shank is done with braided sennit or *uso* cord. The lashing pattern is figure-of-eight turns in which crossings are on the inner side of the shank and the loops are alternately above and below the shank knob. The figure-of-eight turns are either ascending or descending (*li alonga*) according to the choice of the worker. The Pukapukan lashing technique corresponds to that described for Manihiki (29, pp. 171-172, figs. 84, 85). In the ascending pattern lashing, the commencement end is buried and the free finishing end makes seizing turns round the snood to bind the unravelled ends of the snood securely to the length of the snood. The finishing end is buried under several of the transverse seizing turns. In the descending pattern lashing, the commencement end may be buried under seizing turns round snood and free snood ends before the figure-of-eight turns are commenced; the finishing end is buried beneath the last two descending turns. Alternately, the lashing commencement may be buried below the free ends of the snood, but after the lashing turns are completed, the free end of the lashing cord is carried up to the snood and the seizing turns made before the finishing end is buried. A third variation occurs when the wrapped unravelled snood plies are too short to lie against the snood; in this case, the commencement is below the snood, the finishing end is buried beneath the last two turns, and there is no need for seizing turns round snood.

The use of bait strings (*takele mauna*) is a common feature of most hooks. If the buried end of the lashing cord is long enough, it is not cut off flush with the finishing turns, but is allowed to hang free. If the free end of the lashing cord is not long enough to serve as a bait string, an additional piece of fine cord is fastened to the bend of the hook with a slip knot. In use, the bait is laid on the hook and several turns are taken round bait and hook with the bait string.

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

WOODEN HOOKS

227 Wooden hooks vary greatly in size according to the fish they are designed to catch. Small wooden hooks are used interchangeably with the single-piece pearl-shell hook (*tope*) for catching in deep water the smaller reef groupers. Large wooden hooks are used to catch *Ruvettus* and other large deep-sea fish. All wooden hooks are termed *kau*; the largest V-shaped hook is sometimes distinguished by the name *yemo*, the largest U-shaped hook by the name *yowe*.

Wooden hooks are of two shapes, the U-shape and the V-shape. All the hooks are made from *ngangie* wood; most of them from forked branches, [245] some of the U-shaped ones from branches that have been artificially bent and made to grow in this position. The hooks are two-piece, the point being fitted to the point limb with a lashed scarf join. The upper end of the shank is narrowed and provided with a shank knob to support the lashing of snood to shank.

227 284 In larger hooks used for *Ruvettus* and other deep-sea fish, the lashing of point to point limb may be in two or three separate sections. This occurs in five of the eight deep-sea fishhooks available for study. The remaining three hooks are freshly lashed, probably by inexpert fishermen who knew that the hooks, intended for a museum collection, would never be used for fishing. The middle of three lashings is put on the smaller hooks about 1 inch below the bend of the functional point, 2 or more inches below this point on larger hooks. After the transverse turns completing this lashing have been made, the lashing is covered by tough fish scales (*unuui*) of the *malatea* fish which project above and below the lashing. The ends that project below are caught with the transverse turns of the lowest lashing, those that project above are caught with the turns of the topmost lashing. The fish-scale covering protects the middle lashing from being destroyed by the biting teeth of a hooked fish. Because it is usual to protect only this middle lashing, one may assume that a hooked *Ruvettus*, for example, is expected to swallow a hook to the point where his jaws close on this middle lashing, not on the lowest or topmost lashing. The free end of the lowest lashing is carried up over the fish scale covering to commence the topmost lashing; even if this longitudinal thread is severed, the topmost lashing can not become unravelled because the free end is effectively buried in the descending turns. (See lashing in figure 37*c*.)

The clearance between the point and the shank limb varies greatly among the hooks. In small wooden hooks the clearance ranges from 3/16 to 3/4 inch, in the larger hooks from 1 3/4 to 3 1/4 inches. Kennedy states that the required clearance is equivalent to the thickness of the edgewise thumb with the point against the middle of the nail (19, p. 17). Four out of 12 hooks have approximately this clearance, four small hooks have less than this clearance (about 3/16 inch), four large hooks have a much greater clearance (up to 3 3/4 inches). Leaving aside the four smallest hooks used to catch smaller deep-sea fish, I presume that four of the remaining eight wooden hooks used for large deep-sea fish were probably made for ordinary fishermen, the other four for expert fishermen who prefer the hook with the wide clearance. Both types of hook, those with wide and those with narrow clearance, were in common use.

In several of the hooks the point is directed away from the mesial longitudinal [322] line of the shank limb. Presumably the explanation for this in the Pukapukan hooks is the same as that given by Kennedy for Ellice Islands hooks (19, p. 16), that is, the manner in which the scarf surface was cut on the point limb, previously with an adz, today with knife or saw.

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

227/284

Of six V-shaped wooden hooks available for study, four are small hooks attached to the *taumakomako* apparatus used to catch small deep-water fish. (See figure 33, *b*.) These hooks are about 2¼ inches high (from the outside bottom of the bend to the top point of the shank) and 1¼ inches in greatest width (from outside of point limb to outside of shank limb). The clearance between functional point and shank limb is about ⅜ inch. In two hooks, the shank leaves the point at an angle of 40 degrees; in the other two, at an angle of 45 degrees. In all four hooks, the snood is three-ply twisted *uuo* cord which is attached to the shank by descending figure-of-eight lashings of fine *uuo* cord. The free end of this lashing is carried up to the snood and seizes it with several transverse turns. The single lashing of point to point limb is by transverse turns with buried commencement and finishing ends. The lashing of a larger hook is shown in figure 36.

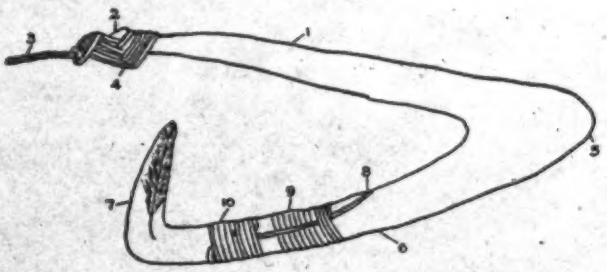


FIGURE 36.—Wooden hook (*kau*) of *ngangie* wood (C6526): hook 5 inches high, 2¾ inches in greatest width, and ⅜ inch clearance between point and shank; diameter of shank (1) above bend ⅗ inch, thickness of bend (5) from outside bottom of curve to inner curve 1¾ inches; angle of shank limb with point limb 50 degrees; snood (3) of three-ply sennit braid attached to shank with descending figure-of-eight turns (4) around shank knob (2); point limb (6) and point (7) scarfed (8) and fastened with two separate lashings; lower lashing (9) made first with simple transverse turns, free end being carried up to commence second upper lashing (10); functional point (7) transversely convex on top, beveled underneath, and projects slightly downward. (Reproduced from Macgregor, 20, fig. 7.)

227

A larger V-shaped hook (termed *yemo*) with a rounded and downward curving point is shown in figure 37,*a*.

Between the V-shaped and the U-shaped hook may be distinguished an intermediate type of which there is one specimen for study (fig. 37,*b*). This is an old hook which has been relashed. Owing to a natural twist in the shank limb, the top of the shank is twisted out of the mesial longitudinal plane running through the bend and point. It is this twist and not that of the point which makes the point appear to be directed away from the mesial longitudinal line of the shank limb.

Of five U-shaped hooks, four appear to have been made from artificially bent wood, one from a forked branch that had a natural inner curve to the bend. The naturally curved hook is shown in figure 37,*c*.

Of the three other U-shaped hooks, the smallest is 4⅜ inches high, 3 inches in greatest width, ¾ inch between point and shank; the second hook is 8¼ inches high, 4¾ inches wide, 1¾ inches between point and shank; the third hook (termed *youve*) is 12½ inches high, 8 inches wide, and 3¾ inches between point and shank.

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

SINGLE-PIECE HOOKS

Pearl-shell Hooks

227
284

Single-piece pearl-shell hooks are made in many sizes to catch all varieties of lagoon fish and most of the smaller deep-sea fish. The hooks are named according to their size and shape. For accurate classification, the name of the fish which the hook is made to catch is usually added to the type name

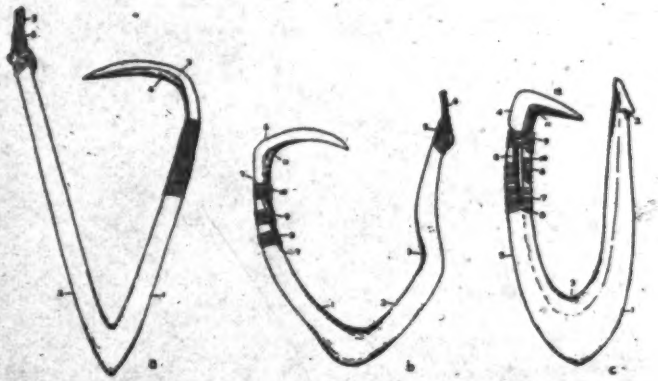


FIGURE 37.—Wooden fishhooks. *a*, large V-shaped hook (*yemo*) of *ngangie* wood (C8092): hook 13⅜ inches high, 7 inches in greatest width, point-shank clearance 2¼ inches; diameter of point limb (1) and shank (2) above bend, ¾ inch; height from outside bottom of bend to inner curve, 1¾ inches; angle of point limb with shank limb 55 degrees; point limb and point (3) scarfed and lashed together with 30 turns of three-ply braided sennit; point flat on inner surface (4) and curves slightly downward; snood (5) of thick three-ply braided sennit attached to shank with descending figure-of-eight turns; free finishing end passes upward to seize snood (6). *b*, intermediate type wooden hook (*kau*) of *ngangie* wood (C8126): hook 10 inches high, 6¾ inches at greatest width, point-shank clearance 2½ inches; diameters of point limb (1) and shank (2) above bend, each 1 inch; thickness of bend about 1½ inches; shank has inward bend (3), above which shank bends backward and away from mesial longitudinal plane; snood (4) lashed with descending figure-of-eight turns (5); point (6) and point limb (1) scarfed (7) and fastened together with three separate lashings (8, 9, 10); point slightly flat on inner curve of bend (11), then curves up and down at point. *c*, narrow U-shaped wooden hook (*kau*) of *ngangie* wood (C8212): hook 5½ inches high, greatest width 2½ inches, point-shank clearance ½ inch; shank (1) ¾ inch diameter above bend, ¾ inch diameter immediately below shank knob (2); bend of hook (3) 1½ inches high from outside bottom of curve to inner bend and 1 inch thick; point (4) lashed to point limb (5) with three separate lashings; middle lashing of six transverse turns (6) made first, lowest lashing (7) second, free end (8) carried over middle lashing to make top lashing (9); remains of fish scale protective covering of middle lashing shown (10); point flat underneath (11), beveled on either side on top (12); distal end of point projects downward.

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

227/254 of the hook. The hooks are made from black- or gold-lipped pearl shell and provided with snoods of sinnet cord. They may be classified by shape into three types: a U-shaped hook, a circular hook that is usually barbed, and a slanted U-shaped hook that may be barbed.

a b c

FIGURE 58.—Shell fishhooks. *a*, pearl-shell hook (*yeki kalanoa*) (Cb158): hook ⅝ inch high, ⅜ inch wide, and ⅛ inch thick; point (1) short, making point-shank clearance comparatively wide; inner and outer surfaces of point limb (2), bend (3), and shank (4) bevelled; shank barb (5) flush with proximal end of shank; snood of finest two-ply twisted sinnet (6) fastened to shank by three transverse turns with free end of snood line which effectively holds snood fast to shank; finishing end (7) tucked under turns and held right; bait string (not shown) of sinnet fiber wound around bend of hook. *b*, barbless, slanted U-hook (*hei sinnet*) of gold-lipped shell (Cb124): hook 1 inch high, ⅝ inch wide; edges bevelled, but owing to irregular shape of shell, point directed away from medial longitudinal line of shank; point (1) bends slightly from point limb (2); wide point-shank clearance; snood (3) of sinnet cord fastened to shank by lashing meant to be descending figure-of-eight turns, but very irregular (4) owing to fact that worker suffered from bad eyesight. *c*, pearl-shell hook (*sukaulo yi kahai*) for albacore (Cb164): hook 2 inches high, 1⅝ inches wide; edges bevelled; point (1) bends slightly from point limb (2); barb (3) runs from point at acute angle, barb-point edge straight, bevelled slightly; wide point-shank clearance; snood (4) of three-ply sinnet cord fastened to shank with descending figure-of-eight turns; finishing end of lashing seizes snood for length of ⅝ inch at 5.

[226/177] **U-shaped hooks.** Small U-shaped hooks (*yeki*) are used for beach angling and for catching the smaller lagoon fish by other fishing methods.

An example of the *yeki* hook (fig. 58*a*) is minute and almost as wide as it is high. It was used for catching *kalanoa* fish before European pins came into use. It is a beautifully made hook and shows craftsmanship of high order. The term *yeki* is applied to hooks of this general shape up to about 2 or 2½ inches high when the name *tape* comes into use. Tape hooks are U-shaped, but tend to be higher than they are wide. The name is also applied to hooks of other material such as turtle shell or coconut shell which have this general shape. The type *tape* hook of pearl shell is shown in figure 59*a*. Other tape hooks in the Bishop Museum collection range in height from 1⅝ to 2½ inches and in greatest outside width from 1 inch to 1⅝ inches. They are made of gold- or black-lipped shell; doubleknot or unwalling figure-of-eight lashings attach the snood of two- or three-ply sinnet cord to the shank of the hook. They are provided with bait strings.

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

227 284 **Circular hooks.** Circular pearl-shell hooks (*matau* and *wakavae*) are made with a barb (*wakatala*). Most of these hooks are as wide as they are high, but the size of the barb varies considerably (fig.39,*b*). In most hooks, the functional point is level with the lowest transverse turn of the snood lashing, directly opposite a point about 3/16 inch below the proximal end of the shank.

In one hook examined in the field, however, the inner curve of the hook was almost a perfect circle, the functional point being on a level with the top of the snood lashing and the proximal end of the shank. Another unusual feature observed on an old hook of this type was a pronounced terminal knob at the proximal end of the shank, separate from, and other than, the customary shank knob which was also cut on the outside of the shank.

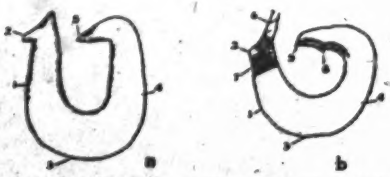


FIGURE 39.—One-piece shell hooks. *a*, U-shaped hook (*tope*): greatest length 2 inches, greatest width 1½ inches, point-shank clearance ¾ inch; *b*, circular hook (*matau* or *wakavae*): greatest length 1½ inches, greatest width 1¾ inches, point-shank clearance ⅜ inch; barb (*wakatala*) markedly concave and beveled; snood thick two-ply *sinu* cord fastened to shank with descending figure-of-eight turns. 1, shank; 2, shank knob; 3, bend; 4, point limb; 5, point; 6, snood; 7, snood lashings; 8, barb. (Reproduced from Macgregor, 20, fig. 4.)

226 176 There can be no doubt that the barbed hook is native to Pukapuka and antedates European influence. The first man to make the barbed hook is said to have been Te Upe, a man of Loto who lived in the reign of Maina, twelve generations ago. His name is mentioned in connection with barbed hooks in an old chant "Ulu taku tangi". Beasley (4, p. 34, pls. XLIX A and XLIX B) figures six hooks of this type apparently collected by Gill prior to 1877. Beasley attributes the hooks to "Pukapuka, Paumotu group", an evident mistake. The figured hooks range in height from 1½ to 2⅜ inches.

227 **Slanted-U hooks.** Slanted U-shaped hooks, large enough to be called *wakaolo* or *wakavae* and used for albacore fishing, have barbs. Small hooks of this type without barbs are called *tui wuo* (fig.38,*b*) and are used to catch the smaller reef fish.

These hooks are much higher than they are wide. The point limb is short compared with the length of the shank and the functional point bends only slightly from the plane of the point limb. The barb runs from the point at a very acute angle making a large point-shank clearance (fig. 38,*b*, *c*).

Despite a superficial similarity in shape of the hook shown in figure 38,*c* to European fishhooks, informants were positive that this type of barbed fishhook was native

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

227 Pukapukan. Their contention is supported by the fact that Gill collected a hook of this shape before 1877. Beasley (4, p. 34) figures the hook in plate XLIX A, no. 2.

284

Turtle-shell Hooks

Single-piece hooks of turtle shell are made in two shapes. One shape corresponds in all respects to the *tope*, U-shaped hook of pearl shell, and is used for the same fish as the pearl-shell *tope*. The hook of turtle shell is termed *tope una*. A characteristic hook of this type (C8223) is 2 inches high, 1½ inches wide and has a uniform thickness of ¼ inch.

A smaller turtle-shell hook termed *kawilo* is used in fishing for lagoon fish with a line from the beach. The type hook is about ⅞ inch high, ¾ inch wide, ⅛ inch thick at the bend. The point-shank clearance is wide. Owing to the fine work necessary, the snood is attached to the shank only with three figure-of-eight turns.

Coconut-shell Hooks

Most hooks cut from coconut shell are made in the shape of the *tope* pearl-shell hook and are called *tope ngaipu*. They are used on the *taumako-mako* composite fishing apparatus and also singly in fishing for the smaller deep-sea fish outside the reef.

The hook is cut from the dry shell from the end opposite to the eyes. One side of the hook has the dark brown color of the outer surface of the coconut shell; the other side has the light brown color characteristic of the inner surface of the shell. The hooks (fig. 33*a*) have a pronounced longitudinal convexity and a slight transverse convexity on the dark brown side. The edges forming the inner curve of the hooks are beveled slightly. The hooks have double or looped snoods attached to the shank.

A small hook (C8185) is 2¼ inches high, 1½ inches in greatest width; it has a point-shank clearance of ¼ inch. The inner curve is a pronounced U-shape, with a greatest inner width of 1 inch. The looped snood is attached to the shank with descending figure-of-eight turns, the finishing end being buried beneath the last two turns.

Composite Hooks

Composite pearl-shell or pearl-shell and turtle-shell hooks (*pa*) are used for trolling and for fishing reef fish. They fall naturally into two classes, the bonito hook (*pa atu*) and the small composite hook, distinguished from the bonito hook by the addition of the name of the fish caught with them to the generic word *pa*.

Bonito Hooks

The bonito hook is a two-piece hook consisting of shank (*pa*) and point (*manga*). The point is pierced with holes (*pu*) through which it is lashed to the distal (*muli*) end of the shank, along with the hackle (*wakamaunga uwo*). The line or snood (*taka* or *wakamaunga*) is passed through the proximal hole of the point, attached to the shank by a lashing that passes

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

227
284

through a hole (*pu pa*) in the thick proximal end of the shank, and seized (*puliunga*) by a lashing thread (*alaala*) passing from the proximal hole of the point to the shank head. The distal end of the shank on the underneath side is cross-hatched (*kotikoti*) to prevent the point-shank lashings from slipping, and filler sticks (*tua niu*), short pieces of coconut leaflet midrib, are pushed underneath the point-shank lashings on either side of the point base to steady the point on the shank.

The following description of the type Pukapukan bonito hook (fig.40) is summarized from an examination of 28 Pukapukan bonito hooks, 11 of these in Bernice P. Bishop Museum, 17 in the field. Terminology employed for parts of the hook is that established by Buck. Lashings are described with the hook horizontal, point to the right, shank head to the left.

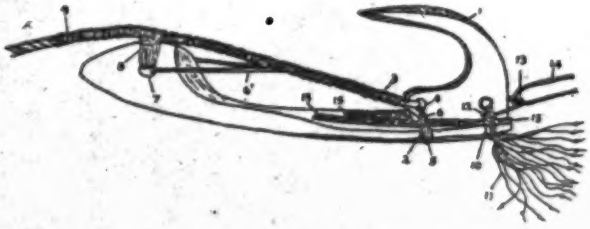


FIGURE 40.—Type Pukapukan bonito hook (C8188): point (1) of gold-lipped shell, beveled at functional point, bend, and outer angle; proximal lashing (2) and snood (3) pass through proximal hole (4); oblique lashing turns on back of shank (5); lashing thread (6), after overhand binding knot around proximal lashing, makes two turns through head hole (7) and proximal hole (4); after last turn through proximal hole, thread seizes snood (3) and its previous turns through head hole; lower threads occasionally left on for short distance and then included again in seizing of snood; toward head, lower threads (6') dropped and seizing continues to head hole; head lashing (8) consists of transverse turns around snood and through head hole, bound with circumferential turns; seizing of snood continues for about 1 inch above head hole (9); distal lashing (10) of point fixes hackle (11) with oblique transverse turns; half hitch binding (12) of distal lashing; thread passes around distal end of point; makes another binding around far side distal lashing, loop knotted (13) and cut to make secondary hackle (14); hackle (11) consists of number of fine threads of *uoo*; filler sticks (15) of coconut leaflet midrib pass under both lashings on near and far sides; shank 3¾ inches long; greatest width of head ⅜ inch, height of head ⅜ inch; width at tail ⅜ inch; thickness of tail ⅛ inch; length of filler sticks 1¾ and 1⅜ inches; length of point base ⅜ inch; thickness of point ⅛ inch.

227
321

The shank is made of strips of shell cut radially through the shell so as to include part of the hinge at one end. The shank length ranges from 3 to 4¾ inches. The length of the hinge-head section in relation to the total length of the shank varies according to the size and thickness of the part of the shell from which the shank is cut. In the hooks examined, length of the hinge-head section of the hooks ranges from ¾ to 3 inches (fig. 41). The width of the tail end of the shanks ranges from ¼ to ⅝ inch, thickness from ⅛ to ¼ inch.

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

227
321

The nacreous inner surface of the shell forms the front of the shank, the rough outer surface of the shell, the back of the shank. The back is sometimes longitudinally flat, more often convex with a slight transverse convexity also. It is ground down to remove the dull rough material and to bring out a clear shiny iridescent or golden surface toward the distal end of the tail. Different surfaces are described in the ordinary color terms: *tuo melo toto*, a deep gold shank back; *tua kena*, a light iridescent color; *tuo pula*, a pronounced rainbow iridescent color.

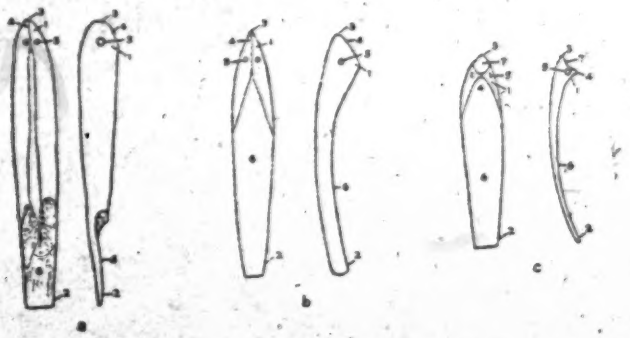


FIGURE 42.—Variation in bonito hook shanks, front and side views. *a*, long shank (C8216) with mesial ridge, slight grinding of head end, short tail section; *b*, type shank (C8187) with well-marked head, tail thicker than usual; *c*, small shank, head has short ridge caused by grinding of proximal end. 1, head; 2, tail; 3, head point; 4, mesial edge; 5, head hole; 6, front nacreous surface; 7, head point ground into concave surface.

A hole is bored transversely from side to side about midway down the thickness of the head. In one shank two such holes were bored, one at the extreme proximal end of the shank, the other nearer the maximum thickness of the head. Only the distal of the two holes carries the head snood lashing and it is evident that the proximal hole was bored by mistake too far back on the head to function properly.

The tails of the shanks are uniformly smooth on front, back, and lateral surfaces. In the opened grave (p. 164), however, Talainga saw a bonito shank that had two paired lateral projections at the tail end of a narrowing shank. He could give no information about the shape of the head of this shank, but the lateral projections are suggestive of similar projections on Melanesian hooks of the Solomon Islands. None could give any information about the shank type. All the hooks examined save one have a cross-hatching scratched on the back of the tail end of the shank.

The point of the bonito hook is shaped from shell cut from the lip edge of the pearl shell. One side shows the inner surface of the shell, the other side the black or gold outer surface which is smoothed down and sometimes polished. Eight points have been made of turtle shell, one of bone, the rest of pearl shell. In all the points the base is prolonged proximally to carry the technical bend of the hook. In 26 points, two holes are drilled through the base of the point to carry the point-shank lashings; two points only have three holes. In none of the points has the proximal hole broken through the upper edge of the point base. Characteristic point shapes are shown in figure 42.

227
284

The snood consists of three-ply twisted *wau* cord about ⅛ inch thick and 20 or more feet long. It is attached directly to the trolling rod without the mediation of a fishline

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

227
284

proper (p. 188). It is lashed to the hook with fine two-ply twisted *tuo*. The hackle is made of short lengths (1 to 1½ inches) of *tuo* cord; the number of separate lengths ranges from 10, if of fine cord, to 28 lengths if of fine thread. Pukapukan fishermen have never used hackles of any material other than *tuo*.

FIGURE 42.—Bonito hook points (*mango*). *a*, common shape, rounded back, point almost parallel with base line; *b*, another common point, similar to *a*, but with longer point base; *c*, point with square back, acute angle at top right edge of base; *d*, short functional point and base, wide bend; *e*, point with well-rounded bend, downward projecting functional point. 1, functional point; 2, bend; 3, base; 4, distal hole (*pu hi mali*); 5, proximal hole (*pu hi muo*).

No ceremonial is associated with the lashing together of the parts of the bonito hook. Considerable variation exists in lashing methods employed. Some fishermen employ separate lashings for the proximal and distal point holes in fastening point to shank, others employ a continuous lashing. The lashing of shank head to snood is also variable; some lashings consist of simple transverse turns, others of transverse and figure-of-eight turns.

A single hole lashing commences at the proximal hole with the middle of a long piece of thread. One end of the thread is left free to make the snood seizings, the other end is used to make transverse turns through the proximal hole of the point and round the shank. On the back of the shank, these turns make oblique crossings (*uakouivi*). On one hook only are the crossings parallel and not oblique. After six or eight transverse turns are made, they are bound on one side with the finishing end of the thread and fastened with overhand knots. On the other side, the free commencement end also binds the turns and is knotted, but the free end is passed backward and forward between the head hole and the proximal hole of the point for two or three turns and laid aside.

The snood is now laid on the front of the shank. One end of the snood is passed through the proximal hole of the point and doubled back along its length for the whole or part of the distance between point hole and head hole. The free end of the proximal hole lashing which has just made the turns between point hole and head hole is now seized round both the doubled snood and its previous turns through head hole with close turns. The point-head hole turns may be left out of the seizing for a few turns and then caught up again, or they may be continuously included in the seizing turns. In any case, toward the head, the point-head hole turns are dropped from the seizing which is continued to a point above the head hole. Most snood-head hole lashings consist of transverse turns between the hole and the snood followed by figure-of-eight turns over the snood, corresponding to the Manihiki method (29, p. 183, fig. 97).

[171]

With a separate length of thread transverse turns are made through the distal hole and round the tail of the shank, fixing the hackle in this lashing with oblique turns according to the Manihiki method (29, p. 179, fig. 91), with the exception, however, that the lashing thread, after making about ten oblique transverse turns, makes half hitch side bindings round the near side lashing of the distal hole. The free end of the thread is passed through the distal hole to the far side, again makes half hitch side bindings round the far side lashing. The free end is then brought back round the distal end of the point, passed under the near side lashing, up, back over it to make a distal point

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

227
284

loop, and is finally fastened with overhand knots to this distal point loop. This loop is stretched and knotted on itself with an overhand knot. The loop is cut below the knot and each end knotted again to prevent unravelling. This method of making the secondary hackle was the one illustrated to me, but it is possible that the Samoan method (*ef.* p. 300) is also employed.

[171] If the base of the point is narrow and the point, after lashing, appears to be loose, filler sticks, ranging from 1 to 2½ inches long, are inserted between the point base and the point-shank lashings to fill this space and tighten up the point. They are used in 17 hooks, absent in 11 hooks.

Variations on type hook. The previous description summarizes the type bonito hook. Variations, especially in lashings, are common.

Continuous lashing of the two point holes to the shank is done with a very long lashing thread. The worker measures this into three sections. Commencing with the middle section, he lashes the proximal hole with transverse, oblique turns, binds this lashing with half hitches and passes one end of the thread up to the head hole. The head hole-point turns may be simple turns passing from the near side proximal point hole to the near side head hole, through the head hole and back to the far side point hole, or they may be oblique figure-of-eight turns, passing from the near side point hole to the far side head hole, through this hole and back to the far side point hole. In either case, after finally passing through the point hole, the seizing of the head hole-point turns continues as before. When the lashing of the snood to the head is completed, the free end of the third section of lashing thread is passed along the base of the point to the distal hole and completes the distal hole lashing, hackle fixation, and secondary hackle as before. Alternately, in one hook, the free end passes through the proximal hole, to the far side, makes a half hitch side binding, then passes back to the near side distal hole between the base of the point and the front of the shank.

The turns between head hole and point in one hook are made by passing the lashing thread from the near side proximal hole of the point up to the head hole, down to the point again, round the far side proximal hole lashing at the side of the point base, up to the head hole, through this, down the near side and round the near side proximal hole lashing. This is continued for the customary three turns and the free end continues with the snood seizing. In yet another hook, the turns between head hole and point have been added after the snood was lashed to the head and instead of passing through the head hole, pass round the head snood lashing between the snood and the head of the shank. The third downward turn on the near side passes obliquely underneath the snood to the far side proximal hole and through this hole to the near side to complete the lashing.

Several hooks have a simpler lashing of snood to the head of the shank. The thread makes transverse turns through the head hole and over the snood, binding these turns with circumferential turns between the head of the shank and the snood. This lashing corresponds to the simple Manihiki technique (25, p. 183, fig. 96).

[171] Most side bindings of point lashings are made with the regular lashing thread. In one hook, however, this is done with a separate short length of thread. The commencing end of this thread is knotted round the near side distal point hole lashing, passes to the near side proximal hole lashing, makes one turn round this, is then pushed through the proximal hole to the far side, binds the far side proximal hole lashing with one turn and passes down to the far side distal hole lashing round which it is knotted.

All but three hooks have the secondary hackle. One has nothing to take the place of this hackle. The second has a thread about 3 inches long knotted an inch from one end round the near side distal hole lashing, the two ends of the thread serving as a sort of secondary hackle. On the far side distal hole lashing, the finishing end of the thread lashing, after being knotted round the distal lashing, is cut off about 1½ inches from

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

the lashing and serves as a single secondary hackle for the distal side. The third hook has on the near side a length of thread which is knotted round the proximal hole lashing and the free end of which passes to the distal hole lashing on the same side, is knotted round this and cut off about 1½ inches from the distal lashing. On the far side, a thread was probably fastened in a similar way, but has been subsequently broken.

Two of the 28 hooks have points with three holes. Informants suggested that both of these hooks showed Manihiki influence. One of them was made by a Manihiki man long resident in Pukapuka and is one of the hooks with the exceptional secondary hackle. The snood is passed through the middle hole, turns between proximal hole and head hole are added as is customary with Pukapukan hooks, and the snood is seized as far as the head with turns that pick up and drop these head turns. The proximal hole lashing passes over the snood loop. The attachment of the snood to the middle hole is the attachment described by Buck (29, p. 177, fig. 89,*e*), and was done presumably for the same reason Buck gives; that is, because of the position of the holes—the middle hole being very close to the distal hole, the snood is passed through the middle instead of the proximal hole, to prevent the point lashings from being too close together. The addition to this hook of the Pukapukan method of seizing the snood presents an interestingly lashed hook which shows characteristic lashing patterns of two atoll cultures fused in the one object and illustrates also the importance of the personality of the fisherman in initiating new features. The hook has no filler sticks.

In the second hook with three point holes, the snood is passed through the proximal hole, the point lashings through the middle and distal holes. The hook is otherwise lashed according to Pukapukan technique and has filler sticks.

Winding of snood. After use, the bonito hook and snood are detached from the bonito rod and soaked in fresh water to wash out the salt from cord and lashings. The hooks are hung to dry in the shade. The snoods are then wound in a characteristic way.

Commencing about 5 inches from the head of the shank, the snood is wound transversely in longitudinal lengths round the fingers of one hand. When the winding has reached a point about 12 inches from the free end of the snood, the lengths are slipped from the fingers and passed over the point of the hook so that they lie along the front of the shank above the seized part of the snood. The free end of the snood is then passed transversely round shank and snood lengths about the middle point of the shank and the finishing end fastened to the last transverse turn with half hitches or overhand knots. The compact bundle of hook and snood is then placed away in safety until it is required again.

Summary. The Pukapukan bonito hook shows a number of constant features which make it a typical example of the western Polynesian bonito hook class as regards both type of point and the attachment of the snood to the point. Examination of a number of hooks reenforces conclusions drawn by Buck from a comparative study of bonito hooks (29, pp. 187-194). Pukapukan variations on the type pattern, while interesting in themselves, merely accentuate constant features of this pattern.

Macgregor (20, pp. 30-31) from an examination of eight bonito hooks in Bernice P. Bishop Museum attributed to Pukapuka, states that Pukapukan hooks "have features other than the snood attachment which make the two types [of eastern and western Polynesian bonito hooks] more diverse than Buck's classification suggests." Macgregor proceeded on the basis of his Pukapukan hooks to make a subdivision in the western group between purely western (Samoa to Pukapuka) and marginal western (presum-

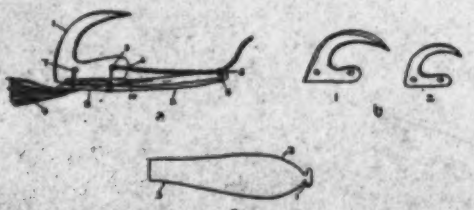
1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

227 ably Pukapuka, also Manihiki, Rakahanga, Fagatau). It is unfortunate, however, that
171 of the eight hooks on which this newer division is based, four only are Pukapukan, the
remaining four hooks being typical Manihiki hooks. Informants were at great pains to
114 make the point clear that Manihiki hooks attributed to Pukapuka were not authentically
Pukapukan even if they were procured from a Manihikian man on Pukapuka. In any
case they felt that the collector had become confused in his localities and had mislabeled
hooks actually procured from Manihiki. Examination of the series of 28 bonito hooks
indicates clearly that all but two of these conform to one general type and that the
remaining two definitely show Manihiki influence. Hence one may conclude that Mac-
gregor's analysis was based on an unfortunate mislabeling of museum specimens which
invalidates his whole argument and indicates that Buck's analysis may still be taken
as final.

Two old Pukapukan bonito hooks are figured in the literature: one collected by Gill before 1877 and shown by Beasley (4, pl. XLIX A, 1), a hook with a pearl-shell shank and turtle-shell point, apparently conforming in all particulars to the type Pukapukan hook. A second hook figured by Edge-Partington (8, 1st ser., pl. 62, 4) is also a typical Pukapukan hook. These hooks help to establish the stability of the Pukapukan type.

Small Composite Hooks

227 Small composite trolling hooks (*pa*) are made with pearl-shell shanks and turtle-shell points (fig.43,*a*). Hooks with shanks from 2 to 2½ inches long are used in trolling for *komuli* fish and are named generically *pa taki komuli*. Smaller hooks, with shanks from 1 to 1¾ inches long, are used for *malau* fish and are termed *pa malau*.



227 FIGURE 43.—Small trolling hook (*pa taki komuli*) (C8133). *a*, composite hook:
284 point (1) first lashed to shank (2) through proximal hole (3); snood (4) passed through proximal hole and seized with free end of proximal hole lashings; seizing continues until head is reached when thread makes transverse turns (5) around shank and binds them with circumferential turns (6), then seizes snood for about 1 inch beyond head; distal hole (7) of point lashed, commencing with thread passing from proximal hole underneath shank (8) across to distal hole on far side, thence back through distal hole and around shank to fix hackle (9) of *wao* fiber with oblique turns; no secondary hackle on this hook; filler sticks (10) inserted between lashings and sides of point base. *b*, small trolling hook points of turtle shell: 1, large point, beveled edges, rounded bend, and inverted functional point; 2, small point, rounded bend, short inverted functional point. *c*, pearl-shell shank: 1, notched projecting head; 2, widest part; 3, tail.

Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

227 Shanks of these hooks are of uniform thickness. They do not have the raised head of the bonito shank. Instead, the head consists of a notched projection (*mulimuli*). The shank widens below the head, then narrows and flares slightly to form the tail (*yitu*; fig. 43.*c*). The greatest width of the shank in larger hooks is about 5/16 inch, in smaller hooks about 3/16 inch; the width of the tail in larger hooks is about 3/16 inch, in smaller hooks about 1/16 inch; average thickness of all hooks is about 1/16 inch.

Shanks are made of both black-lipped and gold-lipped shell. The inner nacreous surface of the shell forms the front of the shank; the outer rough surface, the back of the shank. This rough surface is smoothed and polished, but the black surface is not ground away as in bonito hooks. [321]

All points are of turtle shell. Characteristic shapes are shown in figure 43.*b*. The points range from 1/16 to 3/4 inch in base length and from 1/32 to 1/16 inch in thickness. Two holes only are bored through the base; none of these was broken in the eleven hooks examined.

227 284 The lashing together of the small composite hook corresponds exactly to the method described for the larger bonito hook.

A typical lashing is shown in figure 43.*a*. Lashing of point to tail of the shank may be with a single thread for each hole or with a continuous thread. After the proximal hole is lashed with transverse turns which cross obliquely on the back of the shank, the free end of the thread seizes the snood as far as the head of the shank. In these small composite hooks, no thread is run between proximal hole and the head of the shank. The distal lashing is often bound at the side with the finishing thread to make the characteristic secondary hackle of the bonito hook.

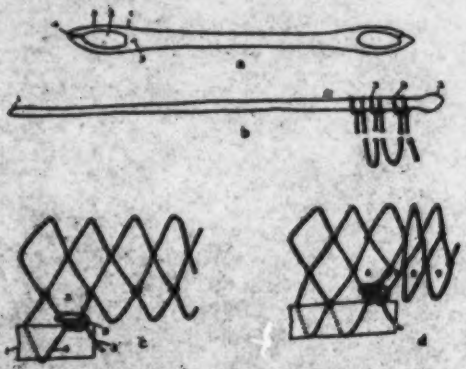
Several slight variations may be noted on this fundamental lashing pattern:

Filler sticks are not used in six out of eleven hooks; in three, the filler sticks are coconut midrib and in two the fillers are short fishbones wedged between the distal lashing and the side of the point base. In one hook, the point is lashed with a continuous thread which commences with the proximal hole. A half hitch side binding is made round the far side proximal hole lashing and the free end of the thread is passed underneath and diagonally across the back of the shank, then up to the near side distal hole to commence the lashing of this hole. In a second hook, the proximal hole lashing is completed and the lashing bound on the near side; the free end of the thread is then passed on the near side to the distal hole to make the distal hole lashing. The snood is passed through the proximal hole, but it is seised with a special lashing thread that is knotted round the far side proximal hole lashing, passes from this through the snood loop, and commences the seizing of the snood on the near side.

Secondary hackles are found on four out of eleven hooks. In two hooks the hackle is made according to the bonito hook pattern. In the remaining three hooks, it is made in slightly different fashion. In the first hook, the near side distal hole lashing is bound with the free finishing end of the lashing thread and the thread is cut about 1 inch from the distal hole. At the far side of the distal hole a thread about 2 inches long is passed through, up, back over the distal hole lashing. In one hook, the two free ends of this thread are twisted together and are knotted with the free end of the projecting finishing thread from the near side hole. In the second hook, the two free ends are tied in a double overhand knot effectively binding the far side distal lashing, and these two ends, together with the free finishing end from the near side, are knotted together to form the secondary hackle. In the third hook, both near side proximal and distal hole lashings are bound with a separate thread that is knotted round proximal side lashing, passes to distal lashing, is knotted round this, and passes again beyond the distal end of the point base where it is knotted with the double ends of a second thread that has been knotted round the far side distal hole lashing.

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

227/284 In one hook only does the point lashing commence with the distal hole. Transverse oblique turns fix the hackle, and the lashing is bound with the finishing end of the lashing thread, which passes round the lashing and is knotted on itself. The commencement end of the separate lashing thread for the proximal hole is knotted to the near side distal lashing and serves as a binder for this lashing. The free end passes to the proximal hole on the near side and makes four transverse oblique turns through this hole and round the shank. When these turns are completed, the free end passes up to seize the snood, lashes the snood to the head of the shank, and again seizes the snood for about 1 inch beyond the head lashing.



227/282 FIGURE 44.—Netting needles and netting technique. *a*, netting needle (*tauna*) of *mahoenoa* wood (*Cleodendrum inerme*): needle 14¾ inches long; 1, expanded end ¾ inch wide; 2, central longitudinal slot (*fua*); 3, sides of slots (*manga*); 4, slit (*tauna*) through which netting cord passes; 5, hole (*fua*) through which commencement end of netting cord knots; cord wound longitudinally between two slots. *b*, netting needle (*tau* or *yuki*) (Cb129) of coconut midrib: needle 6¾ inches long, about ¾ inch diameter; 1, blunt end; 2, terminal knob; proximal end (3) slightly notched (*unukalaleva*) and three lengths of sennit cord attached by clove hitches; when loaded, needle carries 10 or more lengths of netting cord attached to proximal end. *c*, netting technique: to make mesh by ordinary technique, mesh gauge (1) is placed in position so that upper edge touches completed mesh (2); netting cord (3) brought down behind gauge and up around lower edge to form lower loop (4); needle passes through loop of mesh (2), crossing drawn taut on upper edge of gauge where it is held with left thumb while netting knot (5) is made. *d*, to narrow net, same technique followed, but two completed meshes (6,7) brought together by superimposing 7 over 6 with netting knot made as before; in practice, meshes 6, 7, 8, 9 would be brought together by superimposing 7 over 6, 8 over 7, and 9 over 8, with netting knot made around all four gathered meshes (only two superimposed meshes are shown).

NETTING

Nets are made from two-ply twisted *uso* fiber, two-ply twisted sennit (*aka*), and from fibers prepared from the aerial roots of the *yulu* pandanus tree. The methods of preparing these netting cords are described on page 143.

[See Category 283 or 116-- analyst.]

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

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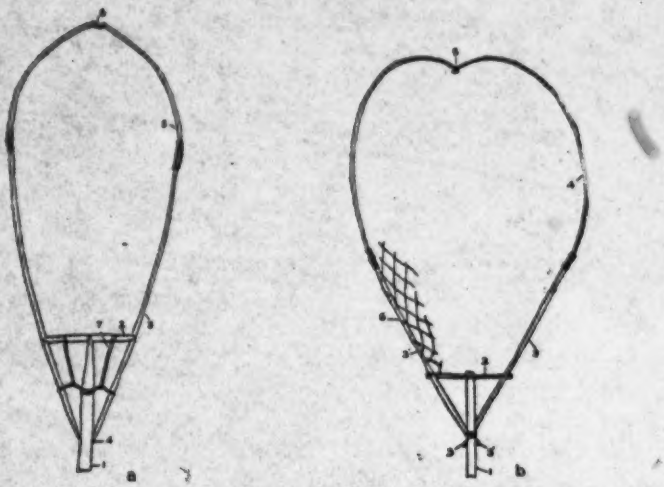

FIGURE 45.—Flying-fish and bird nets. *a*, framework of flying-fish net (*tae malolo*) (C8067): 1, handle (*kautae*) of *puapua* wood, 7 feet 2 inches long, greatest diameter 1¾ inches, diameter at crossbar ¾ inch; head of handle slotted (*ulupo*) to hold crossbar (*ieka*) of *wakanavu* wood (2) which is 10½ inches long, ¾ inch in diameter; crossbar slotted at each end to receive rods (*wangawanga*) of pandanus wood (3) 3 feet long and ¾ inch in diameter at ends where they fit against handle (4); other ends of rods are ½ inch in diameter and are joined to lighter rods (*matai*) (5) of *lakau yili* by scarf joins; each *matai* is 20 inches long and ¾ inch in diameter; the other two ends of two *matai* are notched, brought closely together (6) and joined by continuous transverse turns of cord; lashing of crossbar to handle strengthened by suspensory lashings (7). The lashing of stout rods (*wangawanga*) to handle, shown in figure 46, *a*, *b*, *c*; lashing of head of handle to crossbar and of ends of crossbar to stout rods is in common alternating curves pattern; lashing of stout rods to lighter rods is by transverse turns around scarf join, commencement ends and finishing ends being buried. The suspensory lashing consists of transverse turns around handle and across to stout rods on either side, then transverse turns around cross lashing and crossbar; cross turns and suspensory turns are seized to make lashing taut. Net is 18 inches deep, with greatest width at mouth 19 inches. *b*, bird net (*uwata*) (C8143): 1, handle of *puapua* wood 10 feet long, 1¾ inches at widest diameter, and 1 inch in diameter at head; 2, crossbar of *ngangie* wood is 11½ inches long, ½ inch in diameter; 3, 3′, stout rods of pandanus wood, 2 feet 6 inches long, ¾ inch in diameter; 4, lighter rods of *lakau yili* wood, 3 feet long, ½ inch in diameter at join with stout rods, ¼ inch in diameter at distal point (5) of frame; in attaching frame to handle, crossbar (2) is first lashed to upper side of handle; both stout rods (3, 3′) laid over upper sides of crossbar and under handle, two ends of rods projecting slightly beyond handle, 3′ to right, 3 to left; lashing of rods to handle, of rods to crossbar ends, and of crossbar to head of handle are all of alternate curves pattern; crossbar first lashed to head of handle; free end of cord carried to left end of crossbar and lashes rod to crossbar; free end carried back across crossbar to opposite end of crossbar and

1:Beaglehole and Beaglehole E-5 (1934-5) 1938 Pukapukans

223 284 lashes rod to crossbar end; free end of cord carried down to handle and lashes ends of rods of handle; finally, free end of cord carried down handle, making transverse turns around handle at intervals of 15 inches; 4 feet from proximal end of handle, cord makes 8 transverse turns around handle and fastens with overhand knot. This lashing enables the bird catcher more quickly to draw in his net by providing a firm hold for his hands. Light rods (4) attached to stout rods (3, 3') by scarf joins lashed with transverse turns on one side and oblique transverse turns on the other; two ends of light rods overlap (5) and are fastened together; natural springiness of thin rods makes net framework heart-shaped. Net attached to handle before ends of light rods are lashed together; each rod passes through marginal meshes (6) of net, net being attached directly and without use of marginal cord; proximal end meshes of net are gathered on a double cord which loops loosely around head of handle below crossbar and has two ends knotted together. Net is 29 inches deep; greatest width at mouth 31 inches.

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171 227 286 Netting needles (*tui* or *wawa*) and mesh gauges (*yika*) are used. Of two types of needle, the *wawa* type (fig. 44,*a*) is similar to those used in other parts of Polynesia. One end of the netting cord is passed through the hole and knotted. The rest of the cord is wound longitudinally between the two slots; the knotted end prevents the cord from slipping off the needle when only a few longitudinal turns remain on it. The second type of netting needle (*tui* or *yuki*, fig. 44,*b*) is loaded by making a clove hitch on it at the point of the notch and just forward of the terminal knob (which prevents the clove hitch from slipping off the needle) with the free end of the netting cord. A length of about 30 inches is measured off and another clove hitch made round the needle. This process is repeated until a sufficient length of cord is attached to the needle, hanging from the terminal knob end in double lengths of about 15 inches. In using the needle, a double length of cord is slipped from the blunt point of the needle. When this length has been used up, a second length is slipped from the needle and the process is repeated as the netting advances. In slipping the cord from the needle, the clove hitch in the cord unties itself. Needles are made in various sizes to suit different sized meshes.

The *yika* gauge is a flat rectangular piece of wood scraped smoothly or a piece of turtle shell. A mesh gauge of turtle shell (C8131), used to make the flying-fish net in the museum collection is 3½ inches long, ⅜ inch wide and ⅛ inch thick. The edges are polished smooth. Mesh gauges are of different sizes according to the size of mesh required.

TECHNIQUE

171 227 286 To make a net is *tui te kupenga*; a mesh is *mata kupenga*. The Pukapukan technique of netting (fig. 44, *c*) corresponds to the Samoan method described by Buck (27, pp. 470-472) with one variation.

The netting needle is loaded and the required mesh gauge selected. An assistant holds a light supporting rod of wood around which the first meshes are made, the assistant judging their size by eye. This variation on Samoan starting technique is the same as the Manihikian technique save that a supporting rod replaces the supporting cord used in Manihiki. (See 29, p. 161, fig. 73.) When the Pukapukan netter has made the first row of meshes he transfers these meshes from the rod to a supporting cord. The ends of the cord are knotted and the cord looped round a stick placed in the ground or else round the toe of the netter. As each row is completed, the net is turned and successive rows are added by the same technique.

One Pukapukan method of narrowing bag nets is by the addition of extra meshes, the common Polynesian technique. A second method is by making a netting knot round two or more meshes. Thus in the bird net and in the flying-fish net described below, the bottom of the net is narrowed by gathering together under the thumb four successive meshes and making the netting knot round these four meshes together (fig. 44,*d*). The

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

171 227 286 method corresponds to the Samoan technique of "dropping meshes in the various rows" (27, p. 472): gathering together two or more meshes in one row to function as a single mesh means that in the next row there will be fewer meshes with which to work, hence the technique is equivalent to dropping meshes from subsequent working rows.

TYPES OF NETS

227 286 The seine net (*kupenga*) and the large hand fishnet (*tae yaeke*) have been described (pp. 57-58). The flying-fish dip net (*tae malolo*) consists of a long handle, a crossbar and framework (figs. 45,*a*, 46). Its use is described on page 58.

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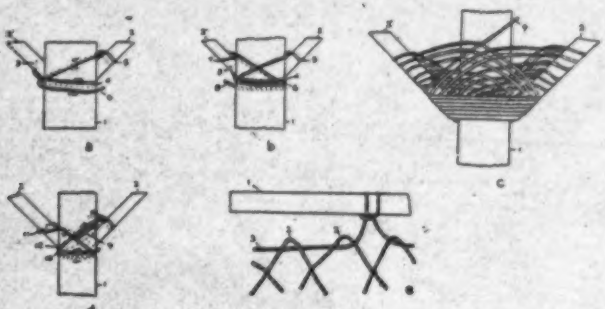

FIGURE 46.—Lashing of flying-fish net framework. *a*, commencement of lashing of stout rods (2, 2′) to handle (1): commencement end of sennit cord (3) laid on far side of left rod; cord brought around in front of handle and transversely (4) around to back, across to far side, then up diagonally across near side, passing between rod (2) and handle, across front of rod (5), then diagonally down far side of handle, passing around and across front of handle (6). *b*, continuation of lashing: free end (6) passes to back of handle, diagonally up and across to rod (2′), around front of rod (7), behind it and diagonally down and across front of handle, and around back of handle (8); this establishes lashing pattern, which is continued for about 12 or more complete diagonal turns passing to each rod. *c*, completed lashing pattern is here shown with six turns only; *d*, on top of pattern are superimposed four superior diagonal lashing turns; method of making turns shown here (inferior lashings omitted); free end of cord (9) passes diagonally down far side of handle, around to front (10), across handle, diagonally up far side (11), around rod (2′), diagonally down near side, around far side of handle again, up diagonally across near side (12) to rod (2), around this rod and diagonally down across far side of handle; lashing pattern is continued until there are two diagonal lashings up and down handle; finishing end of cord carried diagonally across near side of handle to rod (2), makes two transverse turns around rod and buries finishing end underneath these two turns; finished lashing is of neat and pleasing design. *e*, attachment of flying-fish net to frame: 1, rod of framework; 2, marginal net meshes; 3, marginal cord passes through meshes, then up to frame, making a clove hitch around rod, passing down to pick up more marginal meshes; process continued until all marginal meshes are picked up on cord, rod clove hitches 6 to 8 inches apart, free ends of cord wound round handle just below cross-lashing holding suspensory lashing of crossbar to handle; second cord passes through marginal meshes at proximal end of net and is fastened to stout rods above lashing of crossbar.

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

The flying-fish practice net (*tae penu*) used by young men to catch pandanus keys thrown at them in practice sport is of similar shape to the flying-fish net, but smaller.

It consists of a handle of *wetau* wood, 4 feet long and 1½ inches in diameter, a crossbar 8 inches long, ¾ inch in diameter, and two stout rods of pandanus wood, 3 feet long, which are fastened to handle and crossbar, the ends bent close together and tied without the intermediary of lighter rods (*matai*) used in the flying-fish net frame. The lashings of framework and attachment of net to frame are similar to those of the flying-fish net. The practice net is made of the two-ply twisted fiber from the aerial roots of *yalu* pandanus. The net is 13 inches wide at the mouth, 18 inches deep.

The large bird net (*wuata*, fig.45,*b*) differs in shape from the flying-fish net.

The net framework is attached to the handle in such a way that the distal end of the framework rises at an obtuse angle from the plane of the handle. The distal point of the frame is 10 inches higher than the plane of the handle. The framework when viewed sideways presents the shape of an enlarged spatula. When the bird catcher brings down the net upon a flying or roosting bird, the net is reversed so that the distal end of the frame is lower than the plane of the handle. A bird flying from the net is more likely to be caught by the downward projecting spatula-shaped net than it would if the net frame were in the same plane as the handle. The frame and handle are made of light wood so that the net may be easily used in the tree tops. The net itself is made of fine two-ply twisted sennit.

TRAPS AND SNARES

Because the fauna of a coral atoll is extremely simple, there are in Pukapuka only two types of bird snare and a form of the widely distributed western Polynesian rat trap.

The construction and operation of the rat trap (*vaka kiole*) are shown in figure 47. The trap is baited with mature coconut flesh (*ipiipi*) and set in a runway made by rats. The rat is removed by the owner of the trap, who resets the bait stick and spring mechanism.

The coconut-shell bird snare (*maenga kui*) is shown in figure 48,*a*. Another bird snare (*maenga tuli*), shown in figure 48,*b*, is set on the beach, weighted down with stones, and the birds driven through it.

Though not strictly traps or snares, wooden structures (*pa wonu*) in which turtles are kept may be described in this context.

Stakes of *puapua* or *pukamo* wood, each about 5 feet long and 1 inch in diameter, are driven into the sea bottom a few yards from low water level of the beach. The stakes are arranged about 1 inch apart to form a rectangular enclosure 3 feet square, and 4 feet high. The stakes are bound together at top and bottom with horizontal poles and a continuous lashing which makes transverse turns round vertical and horizontal members. Baby turtles, caught as they emerge from their shells, are placed in these enclosures. They are fed regularly on squid and octopus until they are mature enough to be killed for a special food division. The size of enclosures observed varied according to the number of turtles placed within. An enclosure of the above size housed two turtles with shells about 12 inches long. Bigger structures contained five or more small

2: Macgregor E-2 (1933) 1935 Pukapukans
227

[Information in this source which is either inadequate, incorrect or duplication has only been filed in category 116: for description of fishooks, see pp. 27-34.]

793 If the priest has been wholly attentive to his duties, and has
834 been continent the night before the favor is asked, then the
226 gods turn a favorable answer and fishing is successful.

227 [See 1: Beaglehole and Beaglehole, p. 58--analyst.] A
286 kaloma net, e.g., a net used for small beach fish, is made of uka, 10-12 fathoms long, and 6-9 feet deep. It might require 2-3 years to make. The mesh is very small. Vai pule shells were attached to the bottom of the net to serve as weights, and sections of pukama wood were attached at the top to serve as floats. Hauling ropes of kawa tau were served with uka, and attached to the ends of the net.

854 The Pukapukan infant is fed when he is hungry. He plays
855 when he has energy. He sleeps when he is tired. He does
863 any or all these things at any time of the day or night, almost any time, because he mercifully does tend to sleep for most of the night, provided he is young enough, and when he is older, what matters it if he does or not? He can look after himself by this time and so not trouble his elders. The Pukapukan child has no feeding difficulties. If he is not hungry, he does not eat. The oler child takes his food shares away, and either stores it up for a hungry hour or else shares it with another. Nor has the child any excretory difficulties. He is not badly scolded if he dirties his mat; the mat is easily cleaned and so is he by being dropped into the sea. And soon, since no one pays much attention to his excreta, and excretion is considered as natural in this society as eating, he soon learns to go to the sea himself whenever he has need to.

764 [See 1: Beaglehole and Beaglehole, p. 162--analyst.] (From Pau--doubt as to accuracy) Gravestones for children: small stones of any material about 8-9 inches high. Young boy, not wakatane: the stone is placed in the ground with its long side upright. Young girl, not w'wawine: the stone is placed in the ground with its long side on the ground. Children will be buried close together, with the head and feet stones touching those of the next grave. There is no feeling about keeping apart in death wale atua even if they should happen to belong to the same po. Stones for children will be unshaped punga.

285 Note that the making of baskets with handles was not an old
177 Pukapukan custom, but has been introduced, most likely from Rarotonga. Even today these baskets have not any other use save as Bible carriers on Sunday. Their place in Pukapuka was